IRON TRADE REVIEW
Registration Applied For
The Authority of Industry National and International
Vol. LXXII Cleveland, June 21, 1923 No. 25

New Buying Gains, But Slowly

Incoming Tonnage Still Far Below Record-Breaking Shipments—Miscellaneous Business Is Growing—Many Sheet Mills, Some Tin Plate Mills To Close for Repairs—Extra Heavy Rails Advanced $2—Steel Prices Hold

IRON and steel conditions in a broad way, are unchanged. Buyers while they are regaining confidence gradually and are placing a larger new tonnage with producers, are not closing liberally and incoming business falls much short of matching shipments which are extraordinarily heavy in keeping with production. Deliveries are moving up but only slowly. The strong points of the situation remain the way in which tonnage is being absorbed by users of material up to the limit of record-breaking output and the complete absence of requests for the suspension and cancellation of orders. Barring minor exceptions, prices display fundamental firmness.

Plate demands for third quarter are sizing up heavily due to the large bookings as well as to a considerable increase in new business. Revival of interest in oil storage capacity has continued with additional awards the past week. The full order for tanks of the General Petroleum Co. reported at 5000 to 6000 tons a week ago, it develops, amounts to 13,000 tons. A new order at Chicago calls for 4200 tons for 26 tanks and in the Mahoning valley for 3000 tons for 20 tanks. The recent order of the Magnolia Petroleum Co. calls for 30 tanks.

The settling of pig iron continues the chief factor in putting down IRON TRADE REVIEW composite of fourteen leading iron and steel products. This week the index is $46.34 against $46.53 last week and a high mark of $47.70 the first week in May.

Auto Output at Crest

After its extraordinary production record in May, the automobile industry is believed to have reached its crest of activity and some slowing down now is apparent, to be followed by a further seasonal recession in July, it is expected. Some plants at Detroit have reduced their schedules while others still are running at maximum.

This reduction of automobile demands along with the usual difficulties of hot weather have been taken into account by sheet producers in deciding on an extensive shutdown of mills in the approaching week of the Fourth and subsequently. At this time, needed repairs will be made. A score or more of plants will close for one to two weeks. Some tin plate works also will suspend operations though the interruption will not be as widespread as in sheets. Due to the free tonnage which will result from these shutdowns, semifinished steel is easier.

Rail Price Is Raised

Steel rail prices on sections 110 to 130 pounds have been raised to $45 mill by one large producer through the inauguration of an extra of $2 per ton on these weights. Other rail makers are expected to adopt the advance.

Railroad buying has not produced any important features the past week but the consumption of steel by the transportation interests as measured by the tonnage being taken in current shipments has not been equaled in many years. All the leading rail mills are booked to capacity to the end of the present year. One important interest is filled up through February of next year.

New building steel activity remains under check, the week's awards totaling 14,773 tons, but the outlook is more promising. A 7000-ton job for Los Angeles and 4000 tons for Japan are up for bids.

Steel bar demand especially in western territory is keeping up at a high clip with consumers taking every ton that can be shipped. Corresponding conditions still obtain in wire products, tin plate and tubular goods where the mills are making slow progress in catching up on deliveries and are at least three months behind.

Iron Buying in Check

Cautious buying of pig iron still is the rule though the number of small sales for nearby shipment continues to grow. There are indications at Chicago and other points that the third quarter market may be entered upon a spot basis as the bulk of the buying is yet to be done for that period. At the same time more is being heard of foundries being in an overbought position on their second quarter needs because of labor shortages. A leading automobile interest has released 10,000 tons. The Chicago market is down $1 and in the valleys, 50 cents. Apart from recent offerings of special Tennessee iron at $25.50 base, southern iron has been quoted at $26 Birmingham by some sellers.

Business Trend and Chart Section Page 1809

Pig Iron Market Keeps Sluggish

Prices Still Soften Under Concessions by Producers and Resale Offerings—Buyers Close Cautiously and Only as Requirements Press, but Miscellaneous Bookings Are in Larger Tonnage—Southern Market Untested

PITTSBURGH, June 19.—Indifferent buying of pig iron in the spot market continues as consumers pursue their policy of holding up arangements for third quarter supplies. Most grades are 50 cents lower than a week ago. Spot lots of foundry iron taken during the past few days and now offered for negotiation involve 50 to 500 tons at a time and the supposition is that with these filling-in tonnages some buyers may enter July without placing contracts and others may purchase from month to month throughout the quarter. The Hackensmith Wheel & Mine Car Co., Penn. Station, Pa., is understood to have closed upon 500 tons which is practically of gray forge iron at around $27, valley basis. Gray forge is quoted at $27 to $27.50 and is 50 cents lower than last week. The Pittsburgh Valve Foundry & Construction Co., Pittsburgh, now is in the market for 300 tons of No. 2 and 200 tons No. 2X iron. Quotations now current on No. 2 (1.75 to 2.25 silicon) are $27.50 to $28 or 50 cents under last week's level. These quotations are somewhat nominal, however, inasmuch as one or two interests indicate their willingness to quote $27, valley, or Johnstown, Pa., basis on 1000 tons or more. One order for 200 tons of the No. 2 grade placed by a local melter was taken early yesterday at $28, f. o. b. Dunbar, Pa. Bessemer iron is quotable at $28.50, the level arrived at late last week which is 50 cents under the market of a week ago. Sales made at the $28.50 figure involve 50 to 150 tons each, four or five being consumated. No inquiries now are current for this grade. The Bethlehem Steel Co., also is quoting $28.50, f. o. b. Johnstown, on the bessemer grade. Its figure on basic is $27.50, the same as quoted by one or two valley interests which is the basis of the last sales reported here two or three weeks ago. The only inquiries now out for basic involve mostly 1400 to 1500 tons which will be closed in a day or two. One valley steelworks furnace indicates that while it might go to $27 on round tonnages of basic, it as yet has not had an opportunity to do so. Malleable is quoted at $28 to $28.50 valley, while low phosphorus copper free iron in the valley is down $1 to $35, valley. The Shenango Furnace Co. has no present intention of blowing out or banking either of its furnaces.

Buyers Await Low Point

Boston, June 19.—New England foundries have caught up on pig iron deliveries and are rapidly approaching the time when they will have to buy regardless of the market. Apparently it is only lack of confidence in future prices that withholds a heavy tonnage from eastern furnaces at the present time. Buying during the past week has continued meager, one or two orders have been for a little heavier tonnage than heretofore this month, but the aggregate is not enough larger than for the week previous to indicate improved buying. Prices are more or less nominal in view of the small tonnage moving. Eastern Pennsylvania has offered No. 2X iron freely at $29, furnace, or $32.65 delivered. Furnaces in the Buffalo district apparently are not meeting this low level. At least one central Pennsylvania furnace, however, is selling No. 2X iron at $28.50 furnace or $33.42 delivered. Sales are also reported as high as $34.42 delivered for the same grade of iron. Sales include 500 tons of No. 2X iron and several 200-ton lots. A Connecticut foundry is in the market for between 500 and 700 ton. Several other foundries are inquiring for 100-ton lots, but this is more in the nature of feeling the market than intention to buy.

Statistics of American Production of Finished Steel, Domestic and Export Freight Rates, page 1846

More Interest Apparent

Buffalo, June 19.—A little more interest is apparent in the pig iron market but buyers have not yet come in for sizable tonnage. It is reported that $28.50 has been done on No. 2 plain (1.75 to 2.25 silicon) and that No. 2X (2.25 to 2.75 silicon) has been sold for $29. The going price of No. 2 plain is $29. Furnace interests are not yet anxious enough for iron to make competition keen and this is preventing a more rapid weakening of the price. Inquiry is estimated at 2500 tons and sales are placed at 1500 tons.

Demand Increased Slightly

New York, June 19.—Pig iron demand here is somewhat better when contrasted with the recent dullness but continues of small proportions compared to production and the present rate of consumption. It is believed that sales in this general territory during the past week, did not exceed 5000 tons in the aggregate. Included in this business was one lot 1000 tons of foundry iron for July shipment. Buying continues, restricted to prompt and nearby deliveries, and there is some hesitation in closing on inquiries due to that belief of some of the consumers that they can obtain lower prices. On the whole, however, the market continues surprisingly firm in view of the small amount of business. The general level on eastern Pennsylvania and New Jersey foundry iron continues $29 furnace for 1.75 to 2.25 silicon. This figure is being shaded only to compensate for freight rate disadvantages, and a number of the furnaces refuse to grant such concessions. The 2.25 to 2.75 silicon grade generally is bringing $30 at the nearest furnace, although in some instances sales have been made at $29.50. The Buffalo market may be quoted at $28.50 to $29, base furnace, plus 50-cent silicon differentials. Central Pennsylvania foundry iron may be quoted at $27.50 to $28 base furnace, plus 50-cent silicon differentials. On Virginia foundry iron the nominal asking price is $28 base furnace, although some tonnage has sold lower at resale.

Market More Active

Cleveland, June 19.—Indications of a buying movement for the third quarter are beginning to appear, and while business still is in moderate volume, generally speaking, sales and inquiries are increasing. One of the largest merchant furnace interests in the northern Ohio group has booked around 25,000 tons of pig iron so far this month, about double its May bookings. Two buyers who had closed for their third quarter requirements with another lake furnace this week increased their tonnages by 1000 tons, collectively. A number of sales have been made in Cleveland by a Cleveland furnace. The General Motors Corp. is reported to have specified 10,000 tons on a long-term contract. A half dozen inquiries for fairly good lots are pending, those from one district alone received by a furnace interest with headquarters here totaling 6000 to 7000 tons. A general firming up of prices is expected to follow buying within the next few weeks and the majority of makers having good backlogs are not particularly anxious to sell at this stage; otherwise the market would be much more active. Consumers still are urging deliveries in many instances, while certain foundries say they have sufficient iron on hand at present. Some of them overbought for the second quarter. One furnace interest here reports that its carryover from the second quarter, with the tonnage that it has taken for the third quarter, will be sufficient to run it through the next three months. At least three interests here have practically all they can handle for that period. A Cleveland seller is offering iron and has made a half dozen small sales in this city at $30, base furnace, or $30.50, delivered, which would compare with a delivered price of $30.77, if iron was purchased in the valley at $29. Sales down to $28, valley, are reported, but there is no evidence that the price has been done on iron for shipment into Cleveland, which would bring the price here to $29.77. A Cleveland maker sold a moderate lot of No. 3 iron in the week for nearby delivery at $30.50, furnace. Pig iron is being offered at $28, Ironton, and $29, Buffalo. A Pittsburgh valve company is inquiring here for 500 tons of foundry iron. The mar-

ket for basic is quiet, no sales being reported here. A consumer recently reported in the market for 20,000 tons will not be actively interested until later. Jackson county silvery iron is being sold in carlots, a half dozen sales of such size having been made in the week, all at prices $1 lower for the respective grades. The 8 per cent grade is quoted at $38.50.

The Oliver Chilled Plow Co., South Bend, Ind., is inquiring for 500 tons of foundry iron and 900 tons of malleable for July delivery. The sale of 200 tons of Tennessee iron at $27, Birmingham, for this territory is noted.

More Interest is Shown

St. Louis, June 18.—Insofar as actual sales are concerned the pig iron market continues an unimpressive affair, but the past several days have developed more interest on the part of melters than has been noted for several weeks. A number of inquiries have come out, ranging from car lots to 1000 tons and specifying deliveries running through the balance of this month to the end of 1923. In addition, some of the more important melters are quietly feeling out the market.

Uncertainty relative to prices continues the chief deterrent to buying, and this feature has been emphasized by announcement of a Tennessee furnace interest of $25.50 Birmingham for No. 2 southern. While this maker has a relatively small capacity, and is so located as to be unable to compete with the Alabama furnaces for the sanitary pipe business, its price cut has had a decided effect on the psychology of buyers.

The chief inquiry reported was for 1000 tons of foundry iron for the third and fourth quarter. Another melter is asking for prices on 100 tons of 12 per cent silicon. In addition there are inquiries ranging from car lots to 100 tons, and aggregating about 700 tons.

New Business in Small Lots

Birmingham, Ala., June 18.—New business with Alabama furnaces is in small lots and the aggregate as yet fails to show an appreciable tonnage. However, a better feeling is apparent. Most of the small-lot business coming in is for filling-in needs. Alabama furnace companies as yet have made no concessions to get business, and have orders to insure at least 60 days production at the maximum pace. The price is firmly held at $27 Birmingham. Melt in home territory and the shipment of product exceed iron production.

Chicago Iron Down to $31

Chicago, June 19.—Stagnation in the pig iron market and the appearance of resale iron have caused a recession in price to $31, Chicago furnace, though some spot sales still are made at $32. Buying is slow and scattered, and there are indications the third quarter may open largely on a spot basis. Most selling is not further ahead than for July, practically spot. Melters believe $30 will be quoted before the market firms up and then continue their waiting attitude. Chicago producers have close to one-half of their third quarter production covered. Some second

(*Concluded on page* 1783)

Coke Sales Slow Up Again

Connellsville Market Quieter After Spurt in Spot and Contract Buying—Price of Furnace Fuel Continues To Ease Off

COKE PRICES, PAGE 1789

Pittsburgh, June 19.—Activity in beehive coke in the past few days has been somewhat limited after a spurt in the spot market late last week which followed closely upon a somewhat extended period of contract activity for third quarter. While late last week $5.25 was the ruling figure in the spot market, today numerous offers of tonnage at $4.50 and $4.75 are being made and an exceedingly limited tonnage is being sold. With figures of $4.50 to $5 available in the spot market, several buyers are as yet unprotected on their blast furnace requirements for the third quarter and continue to defer action. These include M. A. Hanna & Co., Wheeling Steel Co. and one or two eastern furnaces including the Replogle Steel Co. So far no contract quotations below $5.50 have been developed except the $5.25 price brought out two or three weeks ago in a sale to a Cleveland interest. The majority of sellers quote $5.50 on contracts now open for negotiation, but several indicate they are willing to talk over matters when the various buyers are ready to close. The entire spread of the market this week is $4.50 to $5.50 as against $4.75 to $5.75 last week. On standard selected 72-hour foundry coke, numerous quotations in the spot market are being made at the minimum figure of $5.50. Other producers maintain figures from $6 to $6.50 for contracts, and one interest is obtaining $7 to $7.50. This particular producer apparently is seeking to maintain a stabilized figure for six or 12 months. Several months ago it quoted $7.50 for the first half when the foundry coke market was $9 and higher, and now it seeks to maintain the $7.50 figure for the last half when the going market is $1 to $2 per ton below that level. It has written several contracts involving 1000 to 3000 tons at a time, deliveries to be distributed over the last half. Several contracts have been closed through middle interests during the past week. Production, according to the *Connellsville Courier*, for the week ending June 9 was 295,640 tons as compared with 293,330 tons in the preceding week.

Coke Movement Slower

Boston, June 19.—Demand for foundry coke reflects the sluggish condition in the pig iron market. The movement of coke from New England ovens and also from the beehive district into New England is light. The price from New England ovens still is $14, delivered. Beehive coke is quoted at $12.50 to $13.50, delivered.

Stronger Tone Maintained

New York, June 19.—The stronger tone reflected in the coke market a week ago continues to be maintained and the market on spot foundry coke may be quoted at $5.50 to $6.25, Connellsville, for the usual brands, with special brands bringing $6.50 in some instances. A little contracting for second half continues to be done by one producer but generally the market activity is confined to spot buying. On by-product foundry coke, the Seaboard By-Products Coke Co. continues to quote $11.84 to $11.91, delivered at Newark and other northern New Jersey points.

Buying for Last Half

Cincinnati, O., June 19.—Foundry coke appears firmer. Buying for the last half has been started by a number of consumers. Orders for at least 50 cars of standard Connellsville foundry coke were accepted by two leading sellers during the past week for shipment in that period. This business was on a basis of $7.50, ovens, in open-top cars, and $7.75 in box cars. A large producer in the Connellsville district will make contracts for last half delivery or for delivery from July to July at these prices. Most operators are less unwilling to quote beyond Oct. 1. Spot Connellsville foundry coke was sold during the past week at $6.50 to $7, ovens, while contract prices range from $6.50 to $7.75, the latter price prevailing on special brands. In the New River district ovens are concentrating their efforts on the manufacture of foundry coke and sales have been made at $12.50 to $13, ovens. Demand for Wise county foundry and furnace coke is improving. A Pittsburgh user is inquiring for 2000 tons of Connellsville foundry and furnace coke for the last half.

Less Buying at St. Louis

St. Louis, June 18.—While not particularly active, the market for coke in this district is fairly satisfactory. There has been some recession in buying, especially by metallurgical users. Inquiry from the West and Southwest for eastern coke holds up well, and there is less reaction against prices than heretofore in that general section. Industrial coke continues to move in large volume, especially to the water gas interests. One such interest has put out an inquiry for 2000 tons, the largest before the market. Prices asked by the local by-product plants are steady, and these interests are shipping from 90 to 100 per cent of their current output. The coal situation continues dull and listless. Stocking of steaming coal is confined principally to some railroads and public utility companies. Production at mines in the adjacent Illinois field for the week ending June 2 was about 27 per cent of normal.

Production Holding Up

Birmingham, Ala., June 18.—While new business in the coke market is not active, steady production is maintained and consumers still are urging prompt delivery. Labor is scarce and some of the makers of 72-hour coke are not getting out tonnage as expected. Delivery is at a greater rate than production. Consumption is showing no signs of a reduction. Foundry coke quotations remain around $8 to $9, though $9.25 to $9.50 have been paid for spot shipment.

Pig Iron Market Sluggish

(*Concluded from page* 1787)

quarter tonnage is going over to the third quarter because of labor shortage at foundries. Southern iron is $26 to $27. One southern producer sold some nearby tonnage at $25.50, but has withdrawn the price. The recent sale of 250 tons of northern foundry iron for July at $31 is noted. Inquiry is developing. The sale of 1000 tons of silveries to a Michigan user and the sale of 250 tons of bessemer ferrosilicon to a steelmaker in Illinois are reported. Most sales are in carlots to 200 tons. The market for low phosphorus iron is quiet. One inquiry is for 200 tons. It is quoted at $37 to $38. Chicago silveries are firmer as producers blow out furnaces. Lake Superior charcoal iron is dull.

Small Sales Are Numerous

Cincinnati, O., June 19.—The most interesting pig iron transaction of the past week, was the sale of 600 tons of low phosphorus iron for July and August delivery to a Dayton, O., consumer. Buying in small lots for prompt shipment continues on an active basis. Some business is coming through for third quarter but it has not yet reached proportions where it would have an important bearing upon the market. While there is some shading in prices among sellers, this practice is not general. Silvery irons have been shaded $1 a ton. Northern iron is quoted at $28 to $29, Ironton base. The Southern market is uncertain and untested. All leading sellers continue to quote $27, Birmingham base, but a local selling agency has been accepting orders $25.50 and $26, Birmingham, base for the past week principally on Tennessee iron where an effort recently has been made to move higher silicon material in stock at concessions. Small sales of southern iron continue to be made at $27 Birmingham.

One selling agency reports disposing of 500 tons of malleable in central Indiana for immediate shipment, also sales of small lots of northern foundry, southern and silvery irons. A central Indiana melter closed for 200 tons of northern foundry iron for prompt shipment at $29, Ironton base. Inquiry appears in lots of 100 to 200 tons. A local seller reports the sale of 500 tons of eastern iron and 300 tons of Virginia iron through eastern offices. The Crane Co., Chicago, has closed for 1000 tons of southern iron and between 500 and 1000 tons of malleable for July delivery.

Carrying Over Tonnage

Philadelphia, June 19.—While pig iron demand is improving the total volume of business continues considerably under the rate of production. The outlook is that considerable foundry iron will be bought in the next few weeks. It is doubtful, however, whether this will absorb all the tonnage available through increased production as well as a somewhat restricted rate of consumption. In many instances foundries have been unable to consume iron as expected due to a shortage of molders and numerous plants have available for the third quarter some tonnage which they had expected to use in the second. Some producers estimate that as a result of carrying over such tonnages, with third quarter contracts placed some months ago when strong conditions prevailed, a considerable percentage of third quarter requirements are covered. Those consumers who are not covered ahead now are placing only nearby requirements, as rule. One of the most important developments of the week is the purchase of around 1000 tons of French foundry iron (2.00 to 2.50 silicon) at a delivered price approximately $4 less than that of standard domestic iron. This French iron was standard, except somewhat high in phosphorus. Offerings of foreign foundry are increasing. Incidentally it develops that approximately 1500 tons of Indian foundry iron was sold in this district some weeks ago. Virginia foundry iron was sold in the past week at $27.50, base furnace, plus 50-cent silicon differentials, which now indicates the market. Current inquiry includes one lot of 1000 tons of low phosphorus iron. The current market for eastern Pennsylvania foundry iron continues at $29, furnace, for No. 2 plain; $29.50 to $30, furnace, for No. 2X, while No. 1X, for which there is more demand, is $31, as a rule.

Prices Present and Past

Representative market figures yesterday, and for last month, three months ago and one year ago

	June 20, 1923	May 1923	Mar. 1923	June 1922
PIG IRON				
Bessemer, valley, del. Pitts.....	$30.27	32.07	31.67	26.96
Basic, valley	27.50	29.80	29.80	25.00
*No. 2 foundry, del. Pittsburgh..	29.27	31.91	31.37	25.96
*No. 2 foundry, Chicago.....	31.00	32.50	31.25	23.25
Lake Superior charcoal, Chicago	**36.65**	36.65	35.55	30.00
Malleable, valley	28.00	30.20	29.20	24.20
Malleable, Chicago	31.00	32.40	31.25	23.25
***Southern No. 2, Birmingham..**	**27.00**	27.00	26.50	18.50
*Southern Ohio, No. 2, Ironton	28.00	31.00	30.75	23.25
Basic eastern del., eastern Pa..	28.14	30.75	29.35	25.25
**No. 2X, Virginia furnace ...	28.00	28.60	28.25	24.50
**No. 2X, eastern del., Phila..	30.76	32.76	32.00	27.20
Gray forge, val. del. Pittsburgh	28.77	31.17	30.77	25.96
Ferromanganese, del. Pitts.....	129.79	129.79	120.79	72.82
SEMIFINISHED MATERIAL				
Sheet bars, bessemer, Pittsburgh	42.50	45.40	44.50	35.00
Sheet bars, open-hearth, Pitts....	42.50	45.40	44.50	35.00
Billets, bessemer, Pittsburgh....	42.50	45.00	44.50	35.00
Billets, open-hearth, Pittsburgh..	42.50	45.00	44.50	35.00
FINISHED MATERIAL				
**Steel bars, Pittsburgh	**2.40**	2.40	2.30	1.65
**Steel bars, Chicago	**2.50**	2.50	2.34	1.75
Steel bars, Philadelphia.....	2.72	2.77	2.67	2.01

	June 20, 1923	May 1923	Mar. 1923	June 1922
FINISHED MATERIAL (Continued)				
Iron bars, Philadelphia	$2.72	2.82	2.70	1.96
**Iron bars, Chicago mills.....	**2.60**	2.60	2.53	1.74
**Beams, Pittsburgh	**2.50**	2.50	2.35	1.65
Beams, Philadelphia	2.82	2.87	2.77	2.01
**Beams, Chicago	**2.60**	2.60	2.44	1.75
**Tank plates, Pittsburgh	**2.50**	2.50	2.35	1.65
Tank plates, Philadelphia	2.82	2.92	2.77	2.01
**Tank plates, Chicago.....	**2.60**	2.60	2.44	1.75
Sheets, blk., No. 28, Pittsburgh.	**3.85**	3.85	3.55	3.15
Sheets, blue anl., No. 10, Pitts.	**3.00**	3.00	2.70	2.40
Sheets, galv., No. 28, Pittsburgh	**5.00**	5.00	4.65	4.15
**Wire nails, Pittsburgh.....	**3.00**	3.00	2.90	2.40
COKE				
Connellsville furnace, ovens.....	4.50	5.10	7.15	6.60
Connellsville foundry, ovens.....	5.50	6.10	8.15	7.20
OLD MATERIAL				
Heavy melting steel, Pittsburgh	20.50	22.20	26.10	17.40
Heavy melting steel, eastern Pa.	18.25	20.40	24.85	15.30
Heavy melting steel, Chicago...	17.50	19.75	23.15	14.45
No. 1 wrought, eastern Pa....	22.50	24.40	27.60	17.50
No. 1 wrought, Chicago	16.75	19.95	23.25	14.20
Rails for rolling, Chicago.....	19.00	21.80	24.90	15.40

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon

Composite Market Average

Representing the Combined Average Prices per Ton of Fourteen Leading Iron and Steel Products Yesterday, One Week, One Month, Three Months, One Year and Ten Years Ago

June 20, 1923	June 13, 1923	May, 1923	March, 1923	June, 1922	June, 1913
$46.34	$46.53	$47.52	$45.31	$36.96	$26.78

Products Included Are Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

Iron and Steel Prices

SCRAP PRICES, PAGE 1848, WAREHOUSE PAGE 1840, ORE, N UTS, BOLTS AND RIVETS AND PIPE PRICES, PAGE 1844

Pig Iron

Bessemer, valley	$28.50
Bessemer, Pittsburgh	30.27
Basic, valley	27.50
Basic, Pittsburgh	29.27
Basic, Buffalo	29.00
Basic, del., eastern Pa.	28.14 to 28.50
Malleable, valley	28.00 to 28.50
Malleable, Pittsburgh	29.77 to 30.27
Malleable, Chicago	31.00
Malleable, Buffalo	29.00
Malleable, del., eastern Pa.	31.00 to 31.50

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.23
No. 2 Southern foundry.	1.75 to 2.25
No. 2X East'n and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 to 3.25
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern del., Phila.	31.76 to 32.13
No. 1X Buffalo	30.00
No. 2 foundry, valley	27.50 to 28.00
No. 2 foundry, Pittsburgh	29.27 to 29.77
No. 2 foundry, Buffalo	29.00
No. 2 foundry, Chicago	31.00
No. 2 foundry, Granite City	33.00 to 34.00
No. 2 foundry, Ironton fur.	28.00 to 29.00
No. 2 foundry, Cleveland del.	30.50
No. 2 foundry, del. Phila.	29.76 to 30.13
No. 2 foundry, N. J. tidewater	30.13 to 30.64
No. 2X, eastern del., Phila.	30.63 to 31.13
No. 2X, east. N. J., tidewater	31.13 to 31.64
No. 2X, eastern del. Boston	33.15 to 33.65
No. 2X foundry, Buffalo fur.	29.50
No. 2X, Buffalo, del. Boston	33.92 to 34.42
No. 2 southern, Birmingham	26.00 to 27.00
No. 2 southern, Cincinnati	30.05 to 31.05
No. 2 southern, Chicago	32.01 to 33.01
No. 2 southern, Philadelphia	32.80 to 33.80
No. 2 southern, Cleveland	32.01 to 33.01
No. 2 southern, Boston (rail and water)	32.91 to 33.91
No. 2 southern, St. Louis	31.17 to 32.17
No. 2X, Virginia furnace	28.00
No. 2X, Virginia, Phila.	33.27
No. 2X, Virginia, Jersey City	33.54
No. 2X, Virginia, Boston	33.92
Gray forge, eastern Pa.	28.00 to 29.00
Gray forge, val., del. Pitts.	28.77 to 29.27
Low phos., standard, valley	35.00
Low phos., standard, Phila.	34.79 to 35.79
Low phos., Lebanon furnace	33.00
Charcoal, Birmingham	34.00 to 35.00
Charcoal, Superior, Chicago	36.65

Silvery Iron

Jackson County, Ohio, furnace

8 to 9 per cent	$38.50
9 to 10 per cent	40.50
10 to 11 per cent	42.50
11 to 12 per cent	45.50
12 per cent	47.50
13 per cent	50.00

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 to 11 per cent	$47.50
11 to 12 per cent	50.80

Ferroalloys

Ferromanganese 78 to 82 per cent, domestic, seaboard or furnace	$120.00 to 125.00
Ferromanganese, delivered, Pittsburgh	124.79 to 129.79
†Ferromanganese, 79 per cent English c.i.f. seaboard	120.00 to 125.00
Spiegeleisen 19 to 21 per cent furnace or tidewater, contract	45.00 to 47.50
Spiegeleisen 19 to 21 per cent furnace or tidewater, spot	50.00
Ferrosilicon, 50 per cent contract freight allowed	90.00 to 95.00
Ferrotungsten standard, per pound contained	92.50 to 97.50
Ferrochrome, 60 to 70 chromium, 4 to 6 carbon per pound contained, delivered	12.00
Imported ferrochrome, 4 to 6 per cent carbon	12.00

†Duty paid.

Ferrovanadium, 30 to 40 per cent per pound estimated, according to analysis	$3.50 to $4.00
Ferro carbon-titanium, carloads, producer's plant, per net ton	$200.00

Coke

Beehive, Ovens

Connellsville furnace	$4.50 to 5.50
Connellsville foundry	5.50 to 6.50
New River furnace	9.50 to 10.00
New River foundry	12.50 to 13.00
Wise county furnace	6.25 to 6.75
Wise county foundry	8.00
Alabama furnace	7.50 to 8.00
Alabama foundry	8.00 to 8.50

By-Product

Foundry, Newark, N. J., del.	$11.84 to 11.91
Foundry, Chicago, ovens	15.00
Foundry, Boston, delivered	16.00
Foundry, Granite City, Ill.	14.00
Foundry, Alabama	8.00 to 9.00

Semifinished Material

BILLETS AND BLOOMS

4 x 4-inch base

Open-hearth, Pittsburgh	$42.50 to 45.00
Open-hearth, Youngstown	42.50 to 45.00
Open-hearth, Philadelphia	47.67 to 49.17
Bessemer, Pittsburgh	42.50 to 45.00
Bessemer, Youngstown	42.50 to 45.00
Forging, Pittsburgh	55.00
Forging, Philadelphia	56.17 to 59.17

SHEET BARS

Open-hearth, Pittsburgh	$42.50
Open-hearth, Youngstown	42.50
Bessemer, Pittsburgh	42.50
Bessemer, Youngstown	42.50

SLABS

Pittsburgh	$42.50 to 45.00
Youngstown	42.50 to 45.00

WIRE RODS

¼-inch and finer

Wire rods, Pittsburgh	$51.00 to 55.00

SKELP

Grooved skelp, Pittsburgh	2.45c
Universal skelp, Pittsburgh	2.45c
Sheared skelp, Pittsburgh	2.45c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.50c to 2.60c
Structural shapes, Phila.	2.82c
Structural shapes, New York	2.84c
Structural shapes, Chicago	2.60c to 2.70c
Tank plates, Pittsburgh	2.50c to 2.60c
Tank plates, Philadelphia	2.82c to 2.92c
Tank plates, New York	2.84c to 2.94c
Tank plates, Chicago	2.60c to 2.80c
Bars, soft steel, Pittsburgh	2.40c to 2.50c
Bars, soft steel, Philadelphia	2.72c to 2.82c
Bars, soft steel, New York	2.74c to 2.84c
Bars, soft steel, Chicago	2.50c to 2.60c
Bars, refined iron, Pittsburgh	3.25c to 5.00c
Bars, rail steel, Chicago	2.30c
Reinforcing bars, Pittsburgh	2.40c
Bar iron, common, Phila.	2.72c to 2.82c
Bar iron, common, New York	2.74c to 2.84c
Bar iron, common, Chicago	2.60c
Bars, forging quality, Pitts.	2.65c

Hoops, Bands, Shafting

Hoops, Pittsburgh, large	3.15c to 3.30c
Hoops, Pittsburgh, small	3.50c
Bands, Pittsburgh	3.15c to 3.30c
Cold finished steel bars, Pittsburgh base	3.25c
Steel shafting, Pittsburgh	3.25c
Cotton ties, bundle 45 lb. Pittsburgh	$1.60

Rails, Track Material

Standard bessemer rails, mill	$43.00
Standard open-hearth rails, mill	43.00
Relaying rails, St. Louis	30.00 to 39.00
Relaying rails, Pittsburgh	30.00 to 34.00
Light rails, 25 to 45, mill	2.25c
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	3.15c
Spikes, small railroad, Pitts.	3.75c
Spikes, boat and barge, Pitts.	3.50c to 3.75c
Spikes, railroad, Chicago	3.25c
Track bolts, Pittsburgh	4.00c to 5.50c
Track bolts, Chicago	4.25c
Tie plates, Pittsburgh	2.60c to 2.75c
Tie plates, Chicago	2.60c

Spike, tie plate and track bolt prices for carlots.

Wire Products

To Jobbers in Carloads

Wire nails, Pittsburgh	3.00c to 3.10c
Plain wire, Pittsburgh	2.75c to 3.00c
Annealed wire, Pittsburgh	2.90c to 3.20c
Galvanized wire, No. 9 gage, Pittsburgh	3.35c to 3.60c
Barbed wire, painted, Pitts.	3.45c to 3.70c
Barber wire, galv., Pittsburgh	3.80c to 4.05c
Polished staples, Pittsburgh	3.45c to 3.65c
Galvanized staples, Pittsburgh	3.80c to 4.05c
Coated nails, count keg, Pitts.	2.70c to 2.75c
Woven wire fencing (retailers)	.65 off
Woven wire fencing (jobbers)	67½ off

Chain, Piling, Strip Steel

Chain, 1-in. proof coil, Pitts.	6.50c
Sheet piling base, Pittsburgh	2.55c
Hot rolled strip steel, Pittsburgh stamping quality	3.30c
Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100-inch and heavier, 0.100-inch and heavier, base	5.25c

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	3.75c to 3.85c
No. 28, bessemer, Pitts.	3.75c to 3.85c
No. 28, open-hearth, Phila.	4.07c to 4.17c
No. 28, open-hearth, Chicago	4.19c

TIN MILL, BLACK

No. 28, open-hearth, Pitts.	3.85c
No. 28, open-hearth, Chicago	3.84c to 4.34c

GALVANIZED

No. 28, open-hearth, Pitts.	5.00c
No. 28 bessemer, Pittsburgh	5.00c
No. 28, open-hearth, Phila.	5.32c
No. 28, open-hearth, Chicago	5.34c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	3.00c to 3.25c
No. 10, bessemer, Pittsburgh	3.00c to 3.25c
No. 10, open-hearth, Phila.	3.32c to 3.57c
No. 10, open-hearth, Chicago	3.34c

AUTOMOBILE SHEETS

No. 22 Pittsburgh	5.35c to 5.70c

Tin Plate

Per 100 lb. box

Tin plate, coke base, Pitts.	$5.50 to $6.00

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers in Carloads

	Black	Galv.
1 to 3-inch, butt steel	61 to 62	49½ to 50½
1 to 1½-inch, butt iron	30	13

Boiler Tubes

Less Carload Discounts—Carloads 4 Points Additional

Steel 3¼ to 3¾-inch	38½
Charcoal iron, 3¼ to 4½-inch	5
Seamless hot rolled, 3½ to 3¾-inch	35

Cast Iron Water Pipe

Class B Pipe

Four-inch, Chicago	61.20 to 63.20
Six-inch and over, Chicago	57.20 to 59.20
Four-inch, Birmingham	53.00 to 54.00
Six-inch and over, Birmingham	49.00 to 50.00
Four-inch, New York	63.60 to 65.50
Six-inch and over, New York	59.00 to 60.00
Three-inch, Birmingham	59.00 to 60.00

Class A pipe is $5 higher than Class B.

Standard fittings, Birmingham, base, $110.00 6 to 24-inch, base; over 24-inch, plus $20; 4 inch, plus $20; 3 inch, plus $20; gas pipe fittings, $5 higher.

Little Scrap Being Moved

Market Still Is Weak With Only Small Tonnages Involved in Transactions—Prices Continue To Decline

SCRAP PRICES, PAGE 1848

Chicago, June 19.—Unusually active offerings of iron and steel scrap in the Chicago district are proving a heavy burden on the market, especially as consumers show an utter lack of interest in a further supply. The market is listless and without any support and prices continue to recede steadily. At the same time there is a desire on the part of consumers to accumulate more scrap if it can be obtained at what seems to be bargain prices. One consumer of melting steel is willing to take further tonnage at $17.50 per gross ton. Dealers are more inclined to hold their accumulations for $18, believing the market will pick up later. Foundries, rolling mills and users of specialties are paying no attention to taking on further supply. Railroad offerings are unusually heavy and add to the depressed condition of the market. The Illinois Central railroad offers 16,000 tons for delivery to Aug. 31; the Rock Island offers 4800 tons; the Santa Fe 3300 tons, and the Northern Pacific 1800 tons.

Cast Grades Decline Further

Boston, June 19.—The softening in eastern Pennsylvania pig iron prices has forced foundry grades of scrap still further down the toboggan, and some strictly textile machinery scrap has sold at $23.50 delivered to foundries, the lowest price for this grade in many months. Heavy cast has sold at from $20 to $21 delivered. Prices of other grades have declined somewhat during the week although far less than cast. Chemical borings are fairly active and dealers are paying $15 a ton shipping point. One dealer reports having sold 150 tons at this price. Heavy melting steel has sold at $15.50. Generally speaking, trading is listless and consumers await confidence in future prices.

Market Is Slightly Firmer

New York, June 19.—Reductions of 50 cents are noted in but two grades of scrap, the market being firmer. Machine shop turnings and mixed borings and turnings are the items affected, these now holding at $14 to $14.50 and $13.25 to $13.75, New York, respectively. Demand continues sluggish, with buying of a hand-to-mouth character. The Bethlehem Steel Corp., the leading consumer of steel scrap, continues to pay $18, delivered, for No. 1 railroad steel. With the exception of about 1000 tons now offered by the Lehigh Valley, little scrap is being placed on the market by the railroads.

Adverse Influences Through Working

Pittsburgh, June 19.—In spite of many adverse influences such as held-up orders, cancellations, and lack of consumer buying which lately have been affecting the scrap market, apparently these forces are not operating for the time being. Prices for the most appear to be well stabilized and liquidated. With heavy melting steel about $6 per ton lower than the high point reached several weeks ago, or on the basis of $20.50 to $21, it is believed in the trade that the low point has been reached. Dealers are paying $20.50 to $21, no mill having been able to close at that spread. Dealers are buying to apply the scrap on old orders and lately distress scrap is available, many shorts having accumulated some time ago so that there is a place for every car of scrap that comes out. Transactions usually involve 50, 100 or 300 tons at a time. The National Tube Co., however, bought a 500-ton lot of No. 1 cupola cast this week at around $23.90. Industrial lists of scrap availble for bids all involve relatively small tonnages.

Mills Remain Out of Market

Buffalo, June 19.—The market for iron and steel scrap is quiet with few transactions. Mills are still out of the market and dealers are not anxious to sell at the present prices. Dealers insist the mills will not be able to buy a sizable tonnage under $22 when they do come into the market. Shipments on high priced orders are out of the way and shipping is going forward on the few lower priced orders taken since the present decline. Mills are remaining out of the market longer than most dealers believed could be possible in view of their heavy operation.

Prices Show a Decline

Cleveland, June 19.—Iron and steel scrap movement in Cleveland continues light, consumers still refusing to enter the market excepting to cover immediate needs. As a result prices are dropping. Almost the entire list is affected, declines running from 25 cents to $2.50 a ton. Mahoning valley prices also have sagged 50 cents to $1 a ton. These quotations, however, are largely nominal in the absence of transactions by which to measure actual market strength.

Market Conditions Are Unstable

Detroit, June 19.—Weakness in the scrap market continues to be apparent. While market conditions are unstable at this time, some grades of material are moving into consumers' hands but mainly on old contracts. The better grades of scrap are down $1 a ton at the outset of this week, while some other grades are off 50 cents a ton. Machine shop turnings, machinery cast and stove plate are unchanged in price.

Eastern Scrap Market Dead

Philadelphia, June 19.—With the exception of active buying by one large dealer, the scrap iron and steel market generally is dead. Prices are again lower than they have been. Advices from abroad show that the same condition obtains there. England now has considerable scrap which it would sell cheap. However, there is no interest in importing under present conditions even if a price parity permitted.

Consumers Out of Market

Cincinnati, June 19.—Weakness continues in iron and steel scrap and declines of 50 cents to $1 have been made on various grades during the past week. The market in general is heavy and lifeless. Much scrap is coming out from various sources which adds to the heaviness of the market. The Louisville &

(*Concluded on page* 1804)

Small Sales

Continue in All Ferroalloys—Resale Offerings Appear

FERROALLOY PRICES, PAGE 1789

New York, June 19.—Nearly 1000 tons of English ferromanganese has been sold during the past week, both for nearby and last half shipment, at the full price of $125, duty paid tidewater. Rumors of resale transactions continue to be heard and it is reported that on such business the price has been shaded. The amount of tonnage held for resale does not appear to be large.

No transactions in spiegeleisen have been done during the past week and the market on 20 per cent metal continues nominal at $50 furnace, for spot carloads and at $45 to $47.50 for larger quantities.

A fair business was done in 50 per cent ferrosilicon the past week at $92.50, delivered. Several consumers have been inquiring for tonnage for last half requirements. Owing to the weakness in continental exchanges, some of the importers of ferrochrome have been offering alloy of various carbon contents at prices showing considerable concessions from the domestic market. Tungsten and vanadium prices are unchanged.

First Hands Hold Firmly

Philadelphia, June 19.—No English or domestic ferromanganese is obtainable as far as known at less than $125 tidewater duty paid or furnace from first hands. Sales have been made at this figure the past week. On the other hand, some resale ferromanganese has been offered at $120 tidewater or furnace but this is not being bought very rapidly at this figure.

Pittsburgh Market Still Dull

Pittsburgh, June 19.—Purchases of ferroalloys generally appear to be playing a waiting game, although buying of small lots occasionally develops. When for August delivery, the price on ferromanganese usually is $125, seaboard base; but when for last quarter, such as one for 150 tons just closed, it is $120 seaboard base, making the quotable spread of the market $124.79 to $129.79, delivered Pittsburgh. Several large buyers in this and in the Chicago districts are known to need material for last quarter and sellers expect these purchases to develop by the middle of July. Producers now are filled up until past the middle of September. The Latrobe Electric Steel Co. recently wanted a small quantity of ferromanganese, together with 50 to 100 tons of 50 per cent ferrosilicon; which it is understood to have purchased. The market on 50 per cent ferrosilicon is quotable at $90 to $92.50, freight allowed. One sale of 50 tons of electrolytic ferrosilicon is noted at $51, delivered Pittsburgh.

Interest in spiegeleisen is apparently growing. Several inquiries are out here this week for small lots, 50 to 150 tons. One producer whose furnace not

yet is making spiegel is quoting $50 furnace, on small lots but probably will go to $45 on tonnage, 18 to 22 per cent grade. Another producer is quoting $45 to $47.50, furnace, on the 19 to 21 per cent material and $44 to $46.50 on the 16 to 19 per cent.

The Crucible Steel Co. of America is reported to have purchased tungsten ore. Interest in ferrotungsten and ferrovanadium at the moment is low. Prices are practically unchanged.

Warehouse Business Is Well Maintained

WAREHOUSE PRICES, PAGE 1840

Cleveland, June 19.—Sales of material from warehouse continue to aggregate about the same as during the last few weeks. Buying is in fair volume although purchasers are somewhat more cautious than in the past. All grades of material are moving well. Prices are firm with no change in most cases, although one jobber has announced a revised price on sheets, $2 to $3 per ton lower. The new prices are as follows: Galvanized, 5.80c; and blue annealed, 3.75c.

Shapes and Bars Still Strong

New York, June 19.—While shading of as much as $2 a ton is noted in some quarters on galvanized sheets, the local jobbing market as a whole continues steady. Talk of easier mill prices is heard, but as yet no marked revisions have been noted. Demand is well maintained, according to most jobbers, who declare that shapes and steel bars are still attracting the most interest.

Volume of Business Lighter

Philadelphia, June 19.—While the demand for iron and steel out of warehouse continues heavy, it is somewhat less than the volume over recent weeks. Prices here remain unchanged.

River Carriers Active

Pittsburgh, June 19.—The second tow of the season of the Vesta Coal Co., subsidiary of the Jones & Laughlin Steel Corp., left Pittsburgh with the steamer WARREN ELSEY late last week for Memphis, Tenn., the load consisting of 7000 tons of manufactured steel. The steamer A. O. ACKARD, of the Carnegie Steel Co., fleet, left Pittsburgh June 15, with a tow of barges carrying 5000 tons of pig iron for the Mingo Junction, O., plant. On its return trip the ship will bring a tow of 4000 tons of scrap from that point for use in the Pittsburgh mills.

Installs Handling Dock

Facilities for the improved handling of pig iron and scrap at the Bellaire, O. plant of the Carnegie Steel Co., are being provided. These chiefly consist of a dock improved with a whirler crane with magnet at the river bank although the crane may be mounted upon a caisson built in the river. It will have a long boom to permit of the loading of scrap into, and the unloading of pig iron from barges within a wide radius.

Semifinished Is Easier

Offerings Increase as Producers Prepare to Shut Down Rolling Departments—Large Negotiations Under Way

SEMIFINISHED STEEL PRICES, PAGE 1789

Pittsburgh, June 19.—While it may be but temporary, the semifinished market is somewhat weaker owing to an increasing number of offerings of tonnage by producers of sheet bars, billets and slabs, etc. These tonnages are to be created in the open-hearth and bessemer departments of various producers who will shut down their rolling departments during July for one to four weeks, for the purpose of making repairs. Sheet bars and other semifinished forms to be produced in those periods will either be piled for use later or else will be sold to purchasers among the various conversion mills which will remain active. The general quotation is $42.50, although one or two quotations below that, down to $41, are reported. The latter figure is understood to be on small lots only. The same level, $42.50 Pittsburgh or Youngstown, applies to billets and slabs for the time being.

Bessemer steel is more plentiful than open-hearth, although the latter is in more demand. No sizable inquiries are current on any one of the three products, although one or two places for large tonnages of open-hearth sheet bars are known to be available. Several buyers already have closed on their third quarter requirements at $42.50. Forging billets two weeks or so ago sold at $55 but these now are quoted at $52.50, and while one concession of $5 under that is reported, this has not been confirmed.

Wire rod buyers would place sizable tonnages could they find mills in a position to accept their orders. Many converters of wire rods into nails, etc., need tonnage and would pay the market prices, $51 to $55, to get them. Skelp would move more freely if the pipe and tubular goods mills could bring their operations up to a schedule more in line with their steel supplies and their order books. In this, however, they are hampered by the lack of men. The price still is 2.45c, base Pittsburgh.

Will Offer Tonnage at $45

Youngstown, O., June 19.—Suspension of finishing mill operations during the first week in July will result in free tonnages of semifinished material in this district and while the price at which the tonnage will be offered is not definitely known it is understood $45, Youngstown, will be asked by some makers. Meanwhile, the market is devoid of inquiry. A price of $42.50, Youngstown, is applying on a large portion of third quarter sheet bar contracts with producers in this district. While no definite action yet has been taken, as far as can be ascertained, in revising some former contracts taken on a basis of $45, yet it is generally understood the minimum price will be met.

Offer Sheet Bars At $42.50

Cleveland, June 19.—An easier situation in respect to supplies and prices is apparent in the market for sheet bars, billets and slabs. While $44.50 is said to have been the lowest price a buyer was able to develop on sheet bars recently, the same interest now has offers of $42.50. A valley maker this week offered sheet bars in the Canton, O., district at $42.50. Others are expected to have more material available for the market soon, as their mill schedules are relaxed during the hot weather. Negotiations for some large tonnages of sheet bars are under way. No activity is shown in wire rods but it is expected some independents soon will have tonnage to offer and this will be at the $51 base, Pittsburgh price.

Wire Rod Supplies Larger

New York, June 19.—Due to difficulties in their finishing departments and also to the fact that embargoes prevent them from shipping to some consuming points, the makers of wire rods are able to spare more tonnage and as a result the supply is easier. The wire rod market is quoted at $51, base Pittsburgh, and the premiums which were being obtained recently have disappeared almost entirely. At the same time, the $51 price is not being shaded as far as known. The billet market is quoted nominally at $42.50 to $45, base Pittsburgh, for rerolling quality and $51 to $55, base Pittsburgh, for forging grade.

Billet Sales Are Small

Philadelphia, June 19.—Current billet business is restricted to small and moderate lots in this district. Business in the past week did not aggregate 1000 tons. The current market is $42.50 to $44, base Pittsburgh, equivalent to $47.67 to $49.17, delivered at Philadelphia. Forging billets are $51 to $54, base Pittsburgh. Wire rods now generally are $51, base Pittsburgh, premiums having practically disappeared.

Strip Users Buy Ahead

STRIP PRICES, PAGE 1789

Pittsburgh, June 19.—Customers of the strip steel mills here are booking fairly well ahead in connection with their third quarter requirements. The rate of buying noted so far by representative strip steel producers is such that they are justified in expecting that consumption will continue throughout the third quarter at the same high rate as throughout the second quarter. In a few cases tonnages already arranged for to be delivered during the third quarter exceed second quarter consumption. While in some directions buying by the automotive industry is apparently held in check, this is believed to be temporary. Other consuming lines such as bedstead tubing and agricultural implements are going ahead. The price on hot-rolled strip steel is unchanged at 3.30c, base Pittsburgh, although cold strip makers without hot mills and other preferential customers are called upon to pay 3.15c. Cold-rolled strip steel is unchanged at 5.25c.

Press for Bar Deliveries

Customers Anxious for All Material Due Them on Contracts, but New Business Is in Small Volume

BAR PRICES, PAGE 1789

Chicago, June 19.—Consumers of soft steel bars are taking every ton which can be shipped them from mills and are urging larger and earlier delivery. Apparently no check has occurred in demand for actual delivery, and consumption is at a high rate. Inquiry for further supplies is relatively light. Sentiment is excellent and producers believe sufficient business will continue to come out to assure steady operation at capacity. Because of inability to make delivery considerable inquiry is being turned down by Chicago mills. Agricultural implement manufacturers are well covered for their requirements to the end of the year, and most users in the Chicago district have fairly large commitments with western producers. It appears now that the Inland Steel Co. will have practically no third quarter tonnage to offer, as labor conditions have caused delays in delivery for second quarter, while some tonnages for third quarter have been covered. This interest will take on third quarter tonnage only from regular customers who show conclusively they must have a supply. The company is asking 2.60c, Chicago mill.

Bar iron continues to be booked in less tonnage than a few weeks ago, and shipments are being kept up to the average. Sufficient business is being taken to satisfy producers, who believe the remainder of the year will be fairly active. Most mills will be idle for two weeks during July for the usual summer vacation. Bar iron is quotable at 2.60c, Chicago.

Rail steel bars are firm at 2.30c, mill, with bookings in excess of shipments. Agricultural implement manufacturers and reinforced concrete builders are taking most of the tonnage.

Slow To Close Contracts

Pittsburgh, June 19.—Merchant steel bar users are slowly filling their needs for the third quarter, although a few have made contracts. Several spring steel users have specified July tonnages, and at least two makers have tonnage specifications for the entire third quarter. One or two of the cold-drawn bar finishers likewise have protected themselves on tonnage, while others have been holding off for an announcement by the Carnegie Steel Co. as to its merchant bar price for the third quarter. It is understood that there will be no change from the 2.40c, base Pittsburgh, figure now prevailing. Since this interest is booked for six months or more ahead, there would be no object in changing the price at this time.

Demand for refined iron is fairly steady and is much better now than a month or two ago. One maker who has had a minimum of 3.20c, base Pittsburgh, states that this has been superseded by a 3.25c minimum, and the market now is quotable at 3.25c to 5.00c, base Pittsburgh, depending upon the refinement specification.

Deliveries Are Still Deferred

Cleveland, June 19.—New business is not heavy but the same conditions obtain where buyers are taking all the tonnage they have on order and are pressing the mills to keep up with their shipments. Cancellations and suspensions are practically unknown. While some of the mills are able to make more dependable and earlier shipments, this is not true with the largest producers with which the delivery period still may be stated as substantially four to six months. Prices are firm at 2.40c, Pittsburgh. A report current this week that some bars were sold in this territory under this figure is discredited. The general market on wide bands and heavy hoops continues at 3.15c to 3.30c, Pittsburgh but further instances are reported where the latter figure has been shaded by certain parties on a particular desirable specification.

Cold-Drawn Orders Sizable

Pittsburgh, June 19.—Orders for cold-drawn bars are coming in good volume to representative finishers here. One placed for prompt shipment in the past week involved 500 tons of one size, while several other contracts for third quarter, involve 500 to 1500 tons. All this business is being done at 3.25c, base Pittsburgh. This price is firm. Operations are interfered with somewhat by labor shortage, but steel and car supplies are good. Deliveries are several weeks deferred, depending upon the sizes wanted.

Few New Bolt, Nut Orders Are Being Placed

NUT AND BOLT PRICES, PAGE 1844

Chicago, June 19.—Uncertain conditions in the market for bolts and nuts have produced some irregularity in quotations and it is believed some makers are not adhering strictly to the schedule of discounts. Rumors of shading have not been verified but are heard frequently. Contracts for third quarter supply of this material continue to be closed steadily and users are covering for about their normal requirements. Indications are that purchases for that delivery will be sufficient to give steady operation.

Nut, Bolt Contracts Booked

Pittsburgh, June 19.—Several fair sized contracts for third quarter supplies of nuts and bolts for shipment to both jobbers and general consumers including railroads, have been booked. While large tonnages are not numerous, the return thus far on the basis of the prices noted last week at which most of the second quarter tonnages were booked, looks promising for the July to October period. Several customers have ordered carload lots last week and a large number are purchasing similar and larger quantities this week. This likewise refers to rivets, a fair demand existing for both structural and boiler at 3.25c and 3.35c, base Pittsburgh, respectively.

Volume of Business Unchanged

Cleveland, June 19.—New orders for nuts and bolts are coming in at a fair rate and demand continues as about a week ago. Plants are running close to capacity, deliveries against old specifications providing comfortable operation. Prices are unchanged and firm, although third quarter business can be done at a lower figure.

Little change is noted by rivet manufacturers, the demand continuing at about the same level as in recent weeks. Prices are unchanged with structural and boiler rivets being officially quoted at 3.25c and 3.35c, respectively although considerable shading of these figures is being done on attractive business.

Iron Ore Consumption Sets New Record

ORE PRICES, PAGE 1844

Cleveland, June 19.—Following successively the records made in production of pig iron, consumption of iron ore from the Lake Superior district in May totaled 6,118,540 tons, the largest amount ever used in one month. The consumption of Lake Superior iron ore in April was 5,582,303, the total for May exceeding that by 536,237 tons. The Lake Superior Iron Ore association's figures in detail are as follows:

	Tons
Ore consumed in April	5,582,303
Ore consumed in May	6,118,540
Increase in May	536,237
Ore consumed in May, 1922	3,293,964
Ore on hand at furnaces June 1, 1923	14,786,481
Ore on Lake Erie docks June 1, 1923	4,347,271
Total at furnaces and Lake Erie docks, June 1, 1923	18,864,791
Total at furnaces and Lake Erie docks June 1, 1922	23,024,774

Purchasing of iron ore at present is limited to small tonnages, 10,000 to 15,000 tons, and there are not over a half dozen consumers now in the market for tonnages of that size.

Hoop Demand Exceptional

HOOP PRICES, PAGE 1789

Pittsburgh, June 19.—Exceptional demand for hoops and bands, and hot rolled strips in the hoop and band sizes, is enjoyed by the entire manufacturing trade. Lots of 50 to 300 tons at a time are fairly numerous and a large number of third quarter contracts already have been written up. In fact, certain makers have room for no more business to be delivered during the third quarter. While some preferential customers are able to obtain 3.15c, base Pittsburgh, the general market is firm at 3.30c. Buyers of thin hoops in narrow sizes pay 3.50c, base Pittsburgh.

Protests Filed Against Rate Revision

Washington, June 19.—The investigation and suspension board of the interstate commerce commission is receiving protests against tariffs, effective July 1, revising freight rates on iron and steel articles from the Buffalo-Pittsburgh territories and related

points to Atlanta and other southern points. The railroads are proposing to put into effect a "formula plan" similar to that set up in I. & S. 1303, whereby commodity rates are established by taking a certain percentage of the class rates proposed in Docket 13,494, resulting both in increases and decreases. Since these tariffs will not become effective until July 1 the suspension board will not act until June 29 or 30.

Also as a part of the adjustment of freight rates on iron and steel articles from, to and between southeastern and Carolina territory and Ohio and Mississippi river crossings and related points, the board has suspended tariffs establishing new rates on iron and steel articles between the Pittsburgh-Buffalo territories and related points to Virginia cities. The hearing in the case has been fixed for Washington, July 16, before Examiner Wagner.

Sales of Steel Castings Continue to Drop

Washington, June 19.—May sales of steel castings registered another decline from the high mark of March, a total of 89,493 tons being sold in May as compared with 90,968 tons for April and 143,564 tons in March, according to figures issued by the bureau of census in co-operation with the Steel Founders' society. The reports are based on figures submitted by companies representing over two-thirds of the commercial castings capacity of the United States.

Bookings of railway specialties and miscellaneous castings were at 101.3 per cent of capacity and the latter at 86.5 per cent of capacity. The following tables show the bookings by months for railway specialties and miscellaneous and the total, with per cent of capacity reached.

	Total Net tons	Per cent capacity	Railway Specialties net tons	Miscellaneous net tons
1922				
July	66,166	68.3	32,372	33,794
Aug. ...	63,416	65.4	21,843	41,573
Sept. ...	97,919	101.1	56,781	41,138
Oct. ...	75,709	78.1	34,276	41,433
Nov. ...	60,899	62.8	22,131	38,768
Dec. ...	68,889	71.1	28,271	40,618
1923				
Jan. ...	100,605	103.8	47,879	52,726
Feb. ...	90,152	93.0	39,845	50,307
Mar. ...	143,564	148.2	76,409	67,155
April ...	90,968	93.9	39,610	51,358
May ...	89,493	92.4	38,788	50,705

BOOKINGS

Year	Total	Net tons Total	per cent of capacity
1913.....	956,541	605,592	63.3
1914.....	961,436	458,238	47.7
1915.....	961,436	676,144	70.3
1916.....	998,076	1,061,399	106.3
1917.....	1,063,642	895,388	84.2
1918.....	1,104,443	1,133,910	102.7
1919.....	1,147,368	435,066	37.9
1920.....	1,162,800	793,305	68.2
1921.....	1,162,800	287,674	24.7
1922.....	1,162,800	785,059	67.5

	Railroad specialties	Per cent of capacity	Miscellaneous	Per cent of capacity
1913.....	284,908	63.0	320,684	63.6
1914.....	213,954	47.3	244,285	48.0
1915.....	299,820	66.3	376,324	73.9
1916.....	555,378	122.8	506,021	92.7
1917.....	311,304	67.7	584,084	96.7
1918.....	487,211	106.0	646,699	100.3
1919.....	116,791	25.4	318,275	46.3
1920.....	318,226	69.2	475,079	67.6
1921.....	114,888	25.0	172,786	24.6
1922.....	399,174	86.9	385,885	54.9

Tank Plates More Active

Oil Industry Renewing Inquiries—Sales of Moderate Miscellaneous Tonnage Continue in Fair Volume

PLATE PRICES, PAGE 1789

New York, June 19.—The General Petroleum Corp. recently placed an order for 13,000 tons of plates for storage tanks instead of 5000 as at first reported. This order was placed from the oil company's Pacific coast offices. There is a fair demand here for plates in small and moderate lots, but an absence of large tonnages. One of the largest inquiries is from the Newport News Shipbuilding & Dry Dock Co., which wants about 500 tons of steel for a motor barge for one of the Standard Oil companies. The current market ranges from 2.50c to 2.60c, base Pittsburgh, equivalent to 2.84c to 2.94c, delivered, New York, although it is unnecessary to pay higher than the inside figure for attractive lots for early shipment.

Heavy Consumption Indicated

Pittsburgh, June 19.—New inquiries for tankage or other plate fabrication involve limited tonnages, all below 1000 tons. Plate producers are encouraged over the outlook, due to the fact that within the past several days more inquiries have come out for lots of 200 to 300 tons at a time than previously. Buyers appear to be more aggressive and prospects are exceedingly bright for third quarter consumption. Commitments are fairly heavy, some customers having booked their requirements for the entire third quarter; others for 30 to 60 days. New buying has been somewhat limited but fabricators generally are well booked ahead so that prompt deliveries cannot be obtained. From the present outlook, third quarter consumption will be comparable to that of the second quarter. In a few cases an increased consuming rate is planned. The last tank lettings of size were those of the Magnolia Petroleum Co., reported in the IRON TRADE REVIEW, June 7, involving 4200 tons, and the Humble Oil Co., for a similar tonnage awarded about the same time. Railroad car, locomotive and boiler plates are in fair demand and for one carload of car plates for a Connellsville, Pa. user a valley maker obtained 2.55c, base Pitsburgh, during the past week. The 2.50c, base Pittsburgh, figure however, represents the general market. United States engineers at Louisville, Ky., will take bids until July 16 upon six steel dump scows requiring a round tonnage.

More Tank Work Appears

Chicago, June 19.—After a lull in buying of steel for storage tanks, the oil industry seems to have renewed its activity and considerable tonnage is being asked for this purpose. In addition to the 20 tanks placed by the Magnolia Petroleum Co. last week with the United Iron Works, it appears this company also placed 10 tanks of 55,000 barrels capacity with the Petroleum Iron Works. A fabricator in the Southwest has closed for 4300 tons of plates with a Chicago producer to be used in fabricating 26 storage tanks of 55,000 barrels capacity. Delivery on these plates must be completed by December. A number of other inquiries for plate tonnage for tank construction are in the market. Plates at Chicago are quoted at 2.60c to 2.80c, the lower figure applying to indefinite delivery and the higher to third quarter tonnage, if it can be placed.

Fair Tonnage Coming Out

Cleveland, June 19.—With the market scarcely to be described as active, enough new tonnage from various quarters is coming out every week to reach a considerable total. The Youngstown Boiler & Tank Co. has taken twenty 55,000-barrel oil storage tanks for Texas fields requiring about 3000 tons of plates and has placed a large portion of the steel required with a Mahoning valley plate maker at 2.50c, Pittsburgh. The Louisville & Nashville railroad distributed 500 tons of plates representing its July shop requirements. The Standard Oil Co. of Ohio recently placed 350 tons of boiler steel for a power house in this city. Other inquiries pending call for 200, 160 and 115 tons respectively, the latter being for gas producers for the new tube plant of the Steel corporation at Gary. No action has been taken on the two car ferries requiring 5200 tons of the Pere Marquette railroad or the two to three freight vessels, about 10,000 tons, upon which a lake shipyard is figuring for its own account. The latter project is active, however, and may be concluded shortly. Fabricators have been placing larger orders of plates for filling-in purposes. The trend of the market continues toward the minimum basis of 2.50c, Pittsburgh, as quoted by Steel corporation and larger independent mills. Those makers selling at premiums for quick shipment now are quoting from 2.60c to 2.65c, Pittsburgh or eastern mill.

Close for Third Quarter

Philadelphia, June 19.—Included in the plate business of the past week are some third quarter contracts with consumers who must be assured of tonnage. This business went at 2.50c, base Pittsburgh, or 2.82c, Philadelphia. It was not large in the aggregate. While current demand generally is fair the total is considerably below shipments. Most business is on a basis of 2.50c, and only small lots are bringing more. The Bethlehem Steel Co. and the Lukens Steel Co. took a portion of the 13,000 tons of plates placed recently on the Pacific coast by the General Petroleum Corp. It develops that the Baltimore & Ohio railroad which was reported to have bought 10,000 tons of plates did not close.

Unfilled Orders Large

Net profits of the Crucible Steel Co. of America in May amounted to $605,120. Unfilled orders at the close of the month were the largest in two years, according to a report by the company. The company has resumed payment of dividends at the rate of $1 a share on common stock.

Concrete Awards Small

Lettings of Light Tonnage Still in Good Volume Although Buyers of Larger Quantities Postpone Action in Hopes of Price Advantages

REINFORCING BAR PRICES, PAGE 1789

New York, June 19.—While a number of concrete reinforcing bar tonnages are pending, action on them is proceeding slowly in view of the fact that buyers are trying to do lower than the present prices. The minimum price on concrete bars for mill shipment, however, seems to be 2.40c, base Pittsburgh, and it is known that strong efforts to break this price in connection with certain outstanding tonnages, have proved unavailing. Small tonnages for mill shipment continue to move as high at 2.50c, base Pittsburgh. The market on concrete bars for shipment out of warehouse stocks continues 2.75c to 2.90c, base Pittsburgh.

Majority of Orders Small

Pittsburgh, June 19.—The majority of orders for reinforcing concrete bars are below 100 tons each, involving for the most part 30 to 50 tons apiece. The Inland Construction Co. was awarded the general contract for a building to be erected for the Conroy-Prugh Co., Pittsburgh, requiring 100 tons. This tonnage, with one or two other similar sized lots on general contracts lately placed, are about due for letting. Competition is keen among the fabricators of concrete bars with prices up to 2.55c Pittsburgh, but the mill price remains unchanged at 2.40c.

Large Inquiries Again Up

Cleveland, June 19.—The feature of the week in the local reinforcing bar market was the inquiry for 800 tons of bars and 200 to 300 tons of sheet steel piling for the new dock at Conneaut, O., for the Bessemer & Lake Erie railroad. This is the largest inquiry brought out in this district for several weeks. It is expected that the 300 tons required for the local public library will be placed this week. Lettings have been confined largely to amounts under 30 and 40 tons, with most of the new inquiry being for similar tonnages. On goods out of stock for good sized tonnages, 2.90c is being asked, and for new steel bars 2.40c to 2.50c, base Pittsburgh, is quoted.

Western Tonnage Keeps Up

Chicago, June 19.—In spite of heavy selling of reinforcing bars through the early part of this year and of the apparent lull in construction work in some parts of the country, selling of reinforcing bars at Chicago is keeping up at an unexpected rate. Every seller is booking a multitude of small lots which aggregate a large total. In addition to this, the number of projects involving over 100 tons each continues fairly steady and adds a further large tonnage to sales. The price of reinforcing bars from warehouse continues steady at 3.16c, Chicago, and recent weakness in the east has not been reflected in this market.

CONCRETE CONTRACTS PLACED

Awards this week	7,655 tons
Awards last week	5,355 tons
Awards two weeks ago	1,735 tons

1600 tons, Cooper Dry Goods Co. Los Angeles, to unknown jobber.
700 tons, Arcade Mercantile building, Los Angeles, to unknown jobber.
600 tons, building for Sam Seelig Co. Los Angeles, to unknown jobber.
500 tons, Biltmore garage, Los Angeles to unknown jobber.
500 tons, Central Mfg. District building, Los Angeles, to Pacific Coast Steel Co.
500 tons, Harris Garage, Los Angeles, to unknown jobber.
450 tons, Cooper-Arms Dept. Store, Long Beach, to unknown jobber.
450 tons, Canal street viaduct, Chicago, for Chicago, Burlington & Quincy railroad, to Corrugated Bar Co.
425 tons, junior high school, Seventeenth and Moyamensing streets, Philadelphia, to McClintic-Marshall Co.
350 tons, building for Los Angeles Soap Co., Los Angeles, to unknown jobber.
300 tons, Sherwin hotel, Chicago, to Inland Steel Co.
265 tons, buildings 14-B and 15-B for the Western Electric Co., Chicago, to Concrete Steel Co.
250 tons, Biltmore theater, Los Angeles, to unknown jobber.
200 tons, hotel building at Waukesha, Wis., to Corrugated Bar Co.
200 tons, highway work in Oklahoma, to Corrugated Bar Co.
200 tons, Illinois highway work, to Kalman Steel Co.
150 tons, Illinois highway work, to Concrete Steel Co.
140 tons, building for National Folding Box Co., New Haven, Conn., to Concrete Steel Co.
100 tons, plant for Ford Motor Co., Iron Mountain, Mich., to Truscon Steel Co.
100 tons, warehouse for Bryant Paper Co., Kalamazoo, Mich., to Truscon Steel Co.
100 tons, plant for Northwestern Packing Co., Chicago, to Concrete Steel Co.

CONCRETE CONTRACTS PENDING

1500 tons, medical school and hospital for University of Rochester, Rochester, N. Y.; bids opened June 14.
800 tons, Liberty Memorial, Kansas City, Mo.; bids in.
800 tons, docks at Conneaut, O., for Bessemer & Lake Erie railroad; pending.
400 tons, building for Bell Telephone Co., New York; Foundation Co., general contractor.
250 tons, Union Station, Chicago; bids postponed to June 21.
100 tons, building for the Conroy-Prugh Co., Pittsburgh; general contract awarded the Inland Construction Co., bars to be placed this week.

Pipe Buyers

Seek Increased Shipments Against Orders—Little Municipal Inquiry

PIPE PRICES, PAGE 1789 AND 1844

Pittsburgh, June 19.—Jobbers and consumers of tubular goods, both large and small, are demanding, requesting or pleading for increased shipments. This is particularly true of standard full weight merchant pipe which is quoted at 62 per cent, basing discount Pittsburgh, the price of April 19. While intermittent slackening of activity in some of the western and southern oil fields is reported, this has had little or no effect upon the pipe mills to date, practically all purchasers wanting material on order shipped to them as soon as possible. Only one or two buyers have asked that tonnage be held up for the time being. New business coming up from time to time involves one to eight carloads at a time, exceptionally large tonnages not being acceptable to the mills owing to the fact that their deliveries are from six to 12 weeks deferred. Operations are on the basis of 70 to 80 per cent of capacity, labor still being short.

Little New Inquiry Reported

New York, June 19.—Award of 1500 tons by Marblehead, Mass., is outstanding in the eastern cast iron pipe market. The business was placed with the United States Cast Iron Pipe & Foundry Co. Little in the way of fresh municipal inquiry is reported, although it is known a considerable tonnage is under contemplation. This is particularly true with regard to New York City, which is likely to come into the market for a substantial amount of pipe in the relatively near future. The advanced position of pipemakers undoubtedly is discouraging much business. Prices are steady.

Little Buying, Shops Full

Chicago, June 19.—Producers of cast iron pipe are well booked for much of the remainder of this year and most can give nothing better than two to three months delivery. As a result of this condition they are not worried over the lack of inquiry now evident in this market and competition for business is not spirited. Most sellers find sufficient business coming in small lots from regular customers to absorb whatever extra tonnage they have and they are not anxious to take on business from buyers who are not their regular patrons. This is not true of the entire list of producers, as some are pursuing the policy of taking whatever business they can obtain. The United States Cast Iron Pipe & Foundry Co., has booked 500 tons at Woodward, Okla. and 700 tons for a county project at Dayton, O. Bids will be opened June 19 on 300 tons at Little Chute, Wis. Prices continue firm and without shading, some makers asking more than the quoted figures.

But Little New Business

Birmingham, Ala., June 18.—Little new business is being received by cast iron pipe makers but the orders on hand will call for full operation of plants for four to five months. The American Cast Iron Pipe Co. recently received orders for 154 tons from Alliance, O., and 631 tons from Seattle. The United States Cast Iron Pipe & Foundry Co. and the National Cast Iron Pipe Co., with plants in full operation are well supplied with business and are getting their share of the new tonnage that is being placed. Not much stock is going to the yards. Transportation facilities are good. Inquiry for pressure pipe is lagging.

Tin Plate Contracts

Large for Fourth Quarter—Demand Continues Urgent

TIN PLATE PRICES, PAGE 1789

Pittsburgh, June 19.—Tin plate makers are faced with the largest demand in history, at a time when it is almost impossible to operate fully on account of shortages of skilled and unskilled labor. Pressure is exceedingly heavy for deliveries. Makers of cans want everything on order shipped as promptly as possible. Steel and car supplies are good, leaving the labor supply the controlling factor. Many of the tin plate mills are filled up with business for more than three months on the present basis of opera-

tion. Offers of tonnage for delivery during the fourth quarter already are being made by consumers at prices to be announced later. One lot involved 50,000 base boxes, and was presented by an oil interest this week. The market remains quotable at $5.50 to $6 per base box of 100 pounds, Pittsburgh, the former being the quotation of the American Sheet & Tin Plate Co., as well as several independents, made to regular customers. Some of the latter are able to obtain $5.75 to $6 in different directions on certain lots of business. Operations in this vicinity average 85 to 90 per cent.

Japan Buys Tonnage

New York, June 19.—The tin plate market continues strong and certain consumers who have sought to increase the tonnages due them on contracts have found it difficult to do so. The most important order recently placed involves a tonnage for the Nippon Oil Co. of Japan. Tin plate off stock lists, now generally is bringing $5.50 to $5.75, per base box Pittsburgh.

Wire and Nail

Buyers Not Disposed to Defer Purchases—Supplies Greatly Restricted

WIRE PRICES, PAGE 1789

Pittsburgh, June 19.—Most of the wire mills are filled up for practically three months. The majority of buyers have tonnages coming to them on order, and therefore have not placed all of their third quarter requirements. Notwithstanding recommendations of trade associations that purchases be withheld for 30 to 60 days, customers of nearby mills have proceeded to close on fairly sizable lots. As a consequence, in two or three cases deliveries cannot be had before October and business is not being accepted for shipment that far ahead. Buying of fencing, barbed wire and staples, etc., is slack. The market is considered firm on the basis of 2.75c for wire and 3.00c, base Pittsburgh, for nails. One or two producers continue to obtain prices slightly in advance of these bases.

Mills Still Far Behind

New York, June 19.—While new business in wire and nails does not equal shipments, the mills are making slow progress in catching up with their deliveries. Schedules still are three to four months behind, and in numerous cases urgent requests for nearby delivery of certain items are being refused. The market continues firm at 2.75c, base Pittsburgh, for plain wire and 3.00c for nails.

Heavy Demand For Nails

Chicago, June 19.—Nails still are in strong demand and users are constantly seeking better deliveries. The greatest problem now met by wire mills is to keep shipments moving and properly divided to met the requirements of all users. Not much new buying is being done but mills are sold further ahead than usual and are unable to increase their rate of production. Prices are unchanged.

Lull in New Sheet Sales

Mills Concentrating Efforts on Discharging Obligations—Preparing for Hot-weather Shutdown—Automotive Buying Slows Up

SHEET PRICES, PAGE 1789

Pittsburgh, June 19.—Efforts to discharge obligations already on the books of sheet makers are receiving the major portion of attention during the present lull in new buying. While some of the larger makers of sheets are well filled up from diversified consuming lines through the third quarter and even beyond, unless operating conditions improve, others still have room for tonnage and are soliciting orders for black and galvanized sheets. The American Sheet & Tin Plate Co. is committed to the full extent of its production during July, August and September, and already has turned down considerable tonnage because it cannot make deliveries within a specified period. Pressure on this interest is unusually heavy for deliveries of practically all grades, and apparently consumption during the third quarter promises to compare favorably with that of the second. The leading interest and independents alike are feeling the shortage of skilled workmen for the hot mills and this condition will not improve during the summer months. No concessions in price are noted in this district although several reports are heard that black sheets can be bought at 3.75c. The market is quoted firmly at 3.85c, base Pittsburgh. Galvanized sheets are obtainable from various independent interests at 5.00c, which has been the American company's level for some time. Blue annealed sheets are quoted at 3.00c to 3.25c, and full finished automobile sheets are unchanged at 5.35c to 5.70c, base Pittsburgh. In connection with the latter and one or two other grades used in automobile construction, some suspension in buying is noted by Michigan interests in an effort to develop lower quotations. This is not resulting successfully in this territory. The general average of sheet mill operation appears to remain between 80 and 85 per cent of capacity. This will be greatly lowered during the first week in July when shutdowns will be fairly general for the purpose of making repairs, etc.

Mills Prepare To Suspend

Youngstown, O., June 19.—No appreciable change in the volume of inquiry for sheets is apparent. Black tonnage up for negotiation is not large but the supposition is that a good backlog of this grade will accumulate during the first week in July when all mills in this district will suspend. Despite the inactivity in black sheets the price continues firm at 3.85c, base, Pittsburgh. A fill-in tonnage of blue annealed was booked recently at 3.00c base, Pittsburgh by one producer who is now out of the market on this grade. Only two mills in this district are producing galvanized sheets at present and these are taking care of their customers on the basis of 5.00c, Pittsburgh. Galvanized seconds which early this month were selling at 4.25c now can be purchased from 3.75c to 4.00c, Pittsburgh. Spot tonnages of black sheets frequently can be had at a recession of $2 a ton while shopworn black sheets can be purchased around 3.50c. The usual slowing down of operations is reported at some of the plants of automobile manufacturers in Detroit to make ready for the change of models, and while this condition is reflected somewhat by the volume of inquiry for fine finished sheets, the volume of high-grade business coming to the mills has not dropped off to any appreciable extent. A few consumers of this grade are endeavoring to get their third quarter requirements on mill books while some already have done so. The price of 5.35c for 22 gage will prevail on third quarter tonnage as far as this district is concerned.

Sheet Demand Steady

Philadelphia, June 19.—Sheet demand is steady, but smaller in volume, particularly now that a considerable portion of the trade has closed for the third quarter. Specifications on contracts continue good, though new business generally is not replacing shipments. Blue annealed continues firm at 3.00c to 3.25c, base Pittsburgh, equivalent to 3.32c to 3.57c, Philadelphia. Galvanized sheets are firm at 5.00c, base Pittsburgh. Black sheets generally are 3.85c, but some are obtainable at 3.75c.

Specifications Good

Buffalo, June 19.—While a little easing in the sheet market is noted mills are hopeful of future good business. Specifications, they say, are coming out in good volume, and customers are continuing to use plenty of material. The base still is 3.85c, Pittsburgh on black sheets. The Seneca Iron & Steel Co., will close its 13 mills the first week in July for inventory, minor repairs and vacations.

Sheet Users Want Tonnage

Chicago, June 19.—The market for steel sheets in Chicago is strong, all users who have tonnage on mill books in this district are pressing for immediate delivery, as demand for their products is keeping up. No further tonnage is available for western producers at present. Some rumors have been heard of shading in black sheets, but blue annealed and galvanized are holding firm.

Adds Four Directors

The board of directors of the Eaton Axle & Spring Co., Cleveland, has been increased from seven to eleven members. The new directors are E. B. Greene, vice president, Cleveland Trust Co., and Charles L. Bradley, vice president, Union Trust Co., both of Cleveland; E. V. Walker, Erie, Pa., and W. Forbes Morgan, Morgan, Livermore & Co., New York. Other members are J. O. Eaton, president, R. C. Enos, D. C. Swander and C. I. Oches, vice presidents; Richard Inglis, S. H. Tolles and Arthur D. Brooks.

Shape Market Cheerful

Improved Demand Evidenced in General Tone of Business—Los Angeles Job Takes 6000 to 7000 Tons—May Awards Slump Sharply

STRUCTURAL SHAPE PRICES, PAGE 1789

Washington, June 19.—Sales of fabricated structural steel in May dropped 29.3 per cent from April, or a decline from 184,884 tons to 130,929 tons, according to reports of the bureau of census. The May total is a drop of almost 40 per cent from the high point reached in March, when 216,997 tons actually was booked. The May sales were at 58 per cent of capacity in comparison with the 81 per cent capacity of April sales and the 95 per cent of capacity of March sales.

For comparative purposes the figures below are prorated to obtain an estimated total for the United States of a capacity of 250,000 tons per month, from April, 1922 through May 1923. Earlier figures are based on reports received by the Bridge Builders and Structural society.

Monthly structural awards showing actual tonnage booked, per cent of capacity reached and the estimated total bookings of the companies reporting are as follows:

	Actual bookings, tons	Per cent of capacity	Estimated total bookings, tons
May	130,929*	58	145,000
April	184,884†	81	202,500
March	218,997‡	95	237,500
February	183,938	80	200,000
January, 1923	172,415	75	187,500
December	138,024	60	150,000
November	111,794	49	122,500
October	132,450	58	145,000
September	146,146	64	160,000
August	156,011	68	170,000
July	157,631	69	172,500
June	168,498	73	182,500
May	184,638	81	202,500
April	200,588	87	217,500
March	139,300	77	192,500**
February	78,700	43.5	108,750**

*Reported by 157 companies with a 225,790 capacity. ‡Reported by 167 companies with a 225,425 ton capacity. †Reported by 166 companies with a 228,455 ton capacity.

**Figures of Bridge Builders and Structural society revised on basis of 250,000 tons capacity.

Improved Demand in Evidence

New York, June 19.—Improved demand continues in evidence in the local structural market. With the exception of 1500 tons for the Staten island tunnel, orders are not large but comprise a fair sized total in the aggregate. Inquiries are more numerous. Prices remain virtually unchanged around 2.50c, Pittsburgh, or 2.84c, New York. The only weakness to be noted is in premiums, although some mills still are quoting 2.60c, Pittsburgh, on nearby shipments. Deliveries are a trifle easier, with mills in one or two cases at least able to do better than two months on sizable tonnages. The principal delay appears to be in the fabricating shops, which still are able to do little better than three months, with some quoting four months.

Small Awards and Inquiries Numerous

Pittsburgh, June 19.—One 600-ton award and several of smaller size make up the list of structural shape lettings in this district during the past week. The 600-ton lot went to the American Bridge Co. for a bank at Toledo, O. Practically every fabricator reports the receipt of a fair number of small awards and numerous inquiries for small buildings, coal tipples, school improvements, etc., requiring 50 to 200 tons apiece. All report the plain material market firm at 2.50c, base Pittsburgh, but competition still is keen on material fabricated and erected. The tonnage price usually is around $125 or $130 per ton although for coal tipple work it is somewhat higher, $155 to $200 per ton being the range of recent bids on a nearby coal tipple job. Delivery of fabricated work still is deferred from two to five months and mills likewise are well booked on structural material for the coming quarter. No outstanding tonnages are up for bids in this section although early action is expected to be taken on considerable bridge work for the city, county and state.

Railroads Buy Most Shapes

Chicago, June 19.—Whatever lack of structural steel buying for private and commercial use has come about in the present period of caution has been made up by increased demand for structural steel by railroads. This steel is to be used for bridges and similar purposes in the programs of railroads for improving their lines. In other fields general contractors are satisfied with present conditions, as most of them have as much construction work as they can handle until late in the year and they are not anxious to undertake anything further at present. They believe sufficient new projects will come out late in the year to assure continuous activity. Plain material continues to be quoted at 2.60c, Chicago mill, for indefinite delivery, while some regular customers are able to obtain moderate tonnages from an independent source at 2.70c, Chicago.

Heavy Tonnage in Prospect

Boston, June 19.—Heavy structural shape tonnage is in prospect for the summer and fall. In Boston alone some 12,000 tons are actively under negotiation at the present time. These include the Statler Hotel 4000 tons, new Mason building 2000 tons, and McDonald theatre and garage 3000 tons. Plans for Weymouth, Mass., power plant for which 3200 tons has been awarded the New England Structural Co. now call for 4000 tons. Work of fabrication of this material will start in the near future. Prices of structural shapes are reported somewhat firmer and 2.50c, Pittsburgh is the representative market figure.

Bookings Continue Small

Philadelphia, June 19.—Current structural shape business is comprised mostly of small and moderate lots. While the general total is not large, nevertheless, some of the eastern makers are booking enough tonnage to replace shipments. The market is firm at 2.50c, base Pittsburgh. Included in the recent bookings are a number of tonnages for the West and Middle West at prices ranging from 2.60c, eastern mill, for larger lots, to 2.70c, eastern mill for some small, prompt lots.

New Inquiry Stronger

Cleveland, June 19.—Structural shape lettings of the past week were featured by the award of the 2200 tons for the public library, Cleveland, to the Bethlehem Steel Corp. This project had drawn considerable interest among fabricators represented in this district, most of whom were bidding on the proposition. Small inquiry of 30 and 40 tons continues in good volume and the tone of the market is more cheerful, the general feeling being that the lull, prevailing for the past few weeks, is soon to be terminated by a resumption of buying. Outstanding in the inquiry for the week was that of the Bessemer & Lake Erie railroad, calling for 200 to 300 tons of sheet piling to be used for docks at Conneaut, O. There is no tendency toward price shading, 2.50c to 2.60c, base Pittsburgh, prevailing. On small jobs fabricated shapes are being quoted at $90 to $100 a ton erected.

STRUCTURAL CONTRACTS PLACED

Building awards this week.....14,773 tons
Building awards last week .....12,379 tons
Building awards two weeks ago....10.275 tons

4000 tons, Weymouth, Mass., power plant, formerly awarded to New England Structural Co for 3200 tons.

2200 tons, public library, Cleveland, to Bethlehem Steel Corp.

1500 tons, shaft for Narrows tunnel, New York, to Bethlehem Steel Corp.

1500 tons, additional to Chamber of Commerce building Los Angeles, to Baker Iron Works.

1000 tons, bridge work for Baltimore & Ohio railroad, to Fort Pitt Bridge Works.

880 tons, towers and girder spans for Chicago, Burlington & Quincy railroad, to American Bridge Co.

752 tons, 5-story addition to St. Francis hotel, San Francisco, to Dyer Bros.

600 tons, gas holders for Vacuum Oil Co., at Olean, N. Y., and Paulsboro, N. J., to Stacey Mfg. Co.

600 tons, Borden milk station, Third avenue and Bergen street, Brooklyn, to George A. Just & Co.

600 tons, Home Savings Bank building, Toledo, O., to American Bridge Co.

550 tons, 2-story addition for Champion Coated Paper Co., Hamilton, O., to General Iron Works.

500 tons, Plaza Community church, Los Angeles, to Baker Iron Works.

439 tons, building for Security Trust & Savings bank, Glendale, Cal., to Baker Iron Works.

330 tons, additional storage space to the Jenkins Arcade building, Pittsburgh, to the W. N. Kratzer Co.

300 tons, turntables for Pennsylvania railroad, to McClintic-Marshall Co.

300 tons, gymnasium for Fordham university, New York, to National Bridge Works.

250 tons, shipping building for Westinghouse Electric & Mfg. Co., at Sharon, Pa., to Sommersville Ornamental Iron Works.

247 tons, upset anchor rods and washers, E. L. Wilson Hardware Co., Beaumont, Tex., to Houston Construction Co.

215 tons, two subways at Champaign, Ill., for Illinois Central railroad, to McClintic-Marshall Co.

200 tons, stockyard trestle for Youngstown Sheet & Tube Co., Youngstown, O., to Blaw-Knox Co.

200 tons, Finnish club, New York, to National Bridge Works.

200 tons, extension to Crawford building for J. L. Free Land Co., Cleveland, to Forest City Iron & Steel Co.

188 tons, viaduct at Donovan, Ill., Chicago, Milwaukee & St. Paul railroad, to American Bridge Co.

187 tons, additional shop building for Western Pacific railway to Union Construction Co.

175 tons, erecting shop for Bucyrus Co., South Milwaukee, Wis., to Worden-Allen Co.

175 tons, club house for Evanston Country club, Evanston, Ill., to Duffin Iron Works.

150 tons, bridge for Boston & Maine railroad, Littletown, N. H., to Boston Bridge Works.

120 tons, Federal Land Bank building, Spring-

field, Mass., to Stafford Iron Co.
115 tons, Jewish synagogue, Margaretta and St. Clair streets, Pittsburgh, through Harry Rubenstein, to the W. N. Kratzer Co.
100 tons, Hawthorne Court apartments, Seattle, Wash., to Pacific Coast Steel Co.

STRUCTURAL CONTRACTS PENDING

6000 to 7000 tons, Hall of Justice, Los Angeles; bids in July 2.
4000 tons, machine shop, foundry and forge buildings for Shibaura Engineering Works, Yokohama, Japan; to be let soon. H. K. Ferguson Co., Cleveland, has general contract for 16 buildings for this company.
4000 tons, Statler hotel, Boston; pending.
3000 tons, McDonald theater and garage, Boston; pending.
2690 tons, bridge work for the Chicago & Rock Island railroad; will be readvertised.
2000 tons, Masonic temple, Boston; pending.
1300 tons, loft, Forty-seventh street, near Sixth avenue, New York, bids asked.
950 tons, hotel, Bedford Springs, Pa.; bids being taken.
650 tons, bridge over Grand river at Grand Haven, Mich.; all bids rejected.
500 tons, widening of Folsom street bridge, Milwaukee; general contract for substructure to S. M. Siesel Co., Milwaukee, and for superstructure to Newton Engineering Co., Milwaukee.
270 tons, three bridges for New York Central railroad; Bethlehem Steel Corp. low bidder.
250 tons, Straus building, Milwaukee; Gustave F. Kahn Caswell block, general contractor; taking bids.
190 tons, work for Kleiber Motor Truck Co., Los Angeles, general contract to Austin Co.
150 tons, three 75-foot deck girder spans for Pennsylvania railroad, southwestern region, St. Louis; bids in.
145 tons, addition to freight shed for Union Pacific Railroad Co., Los Angeles; pending.
120 tons, transmission towers at Snohomish, Wash.; bids asked.
100 tons, Buttress & McClellan Co. Los Angeles, general contract to Austin Co.

Forms Machinery House

F. F. Brodie, formerly president of the Empire Machinery Exchange, Cleveland, has organized a new company under the name of the United Machinery & Supply Co., which has opened an office and salesrooms at 1609 St. Clair avenue, Cleveland. The company, which will deal in new and used machinery and supplies, is incorporated with a capitalization of $5000, no par value. Mr. Brodie is president of the new company, other officers of which will be announced later.

Iron Ore Imports

Philadelphia, June 19.—Imports of iron ore, received at this port for the week ending June 16 fell off considerably from the total of the few preceding weeks. Metals and ores received during the past week total as follows: Chrome ore, from British South Africa, 4000 tons, from Greece, 1950 tons; pig iron, from British India, 1015 tons, from England, 3000 tons; scrap steel, from England 45 tons; scrap brass, from Canada 46 tons; ferromanganese, from England, 444 tons, and iron ore from Sweden, 1382 tons.

Stoker Sales Increase

Washington, June 19.—Sales of mechanical stokers in May increased sharply over those of April, a total of 194 being sold in May as compared with 167 of April and 120 in March, according to figures of the bureau of census. The increase was in the water tube boilers, of which 180 were sold in May as compared with 153 in April. Fire tube boiler sales were 14, the same number as were sold in April.

Roads Press for Steel

Extra Heavy Rails Are Advanced $2—Insistent Demands by Carriers for Added Commitments and Early Deliveries

RAILROAD TRACK MATERIAL PRICES, PAGE 1789

New York, June 19.—An eastern maker has established an extra of $2 per ton on standard steel rails in weights of 110 pounds to 130 pounds. This would make the current price on these rails $45, mill. Other makers of steel rails are considering the matter and it is probable will adopt a similar extra. The smaller eastern railroads have not yet made any decision with respect to rail purchases. The Lehigh Valley and the Lackawanna systems now have the matter of second half rails under negotiation but have not settled as yet as to the tonnages or as to what deliveries are wanted.

Railroad freight car buying remains at a standstill, in this district, with an inquiry from the New York, New Haven & Hartford for the repair of between 500 and 1000 box cars an outstanding feature. In the locomotive market, an inquiry for 10 locomotives from the Norfolk & Western is the leading development, with orders restricted to one and two engines. The American Locomotive Co. has booked a locomotive for the Central East Palma and two for the Ferrocarril De Antioquia, Colombia, and the Lima Locomotive Works, a shaw engine for the Champion Fibre Co. Among orders recently booked by the Baldwin Locomotive Works are two locomotives for the Atlantic Fruit Co. of Central Tanamo, Cuba; one for the Meridian Lumber Co., and one for the Red River & Gulf. The Sewell Valley is inquiring for one locomotive.

Hard to Supply Railroads

Chicago, June 19.—Efforts to keep steel moving from mill to railroads and carbuilders are the principal concern of steel mills at present, as railroads are directly or indirectly by far the most important consumers of steel this year. As a seasonal matter railroads need steel at certain times and are pressing every resource to obtain requirements from mills in rails, track fastenings, repair material and also for steel to be used by builders in turning out new equipment. Practically no buying of new cars is being done at present except a few, small, scattering purchases. Inquiry for new cars is equally small. Nothing is being done at present on further sales of standard steel rails and renewed activity in this department is not looked for at present. Considerable inquiry is being made for track fastenings for early delivery. Light rails are inactive.

Substantial Tonnages Placed

Pittsburgh, June 19.—Substantial tonnages of light rails, all things considered, are being shipped weekly by the mills selling out of this territory. This business remains somewhat limited owing to the curtailed activity of the coal mines from which the majority of light rail orders is coming, buying by lumber camp and general contractors also being somewhat smaller than usual. Numerous single carloads are placed each week with a fair sprinkling of larger orders. The price still is 2.25c, base Pittsburgh.

The outlook for track accesories is encouraging. A large number of supplementary inquiries are current for both spikes and tie plates, each of four or five railroads wanting additional supplies of 100,000 tie plates or so at a time. Several of these are wanting lots of 1000 to 2500 kegs of spikes. These all are for shipment as soon as possible, most of the larger roads having considerable material on orders undelivered. Not many large contracts for forward delivery have been placed as yet although deliveries even now are two to three months deferred on certain sizes. Some interest too is manifest in track bolts in carload lots, with a few larger quantities also in demand. Standard spikes are quoted at 3.15c, small spikes at 3.75c, boat and barge spikes at 3.50c to 3.75c, tie plates at 2.60c to 2.75c, and track bolts large, 4.00c to 4.25c and track bolts small, up to 5.50c, all base Pittsburgh.

Tie Plate Order Closed

Cleveland, June 19.—An order for 95,000 tie plates for the Wheeling & Lake Erie railroad has been placed with a producer in the Ohio river territory. The inquiry for 100 to 200 coal cars for the Pittsburgh & Bessemer Coal Co. still is pending. Tie plate prices have have shown some variation in recent competition in this territory.

CAR ORDERS PLACED

New Haven Gas, Light & Coke Co., two tank cars, to Standard Tank Car Co.

CAR ORDERS PENDING

Detroit United lines, 30 flat cars; bids asked.
Lyon Hill Co., 100 cars various types; bids asked.
Southern Pacific railroad, 50 gondolas; bids asked.
New York Central railroad, repairs on 2000 cars; bids asked.
Anaconda Copper Co., 24 dump cars; bids asked.
Nashville, Chattanooga & St. Louis railroad, 75 hoppers and 175 gondolas; bids asked.
Wabash railroad, one private car; bids asked.
New York, New Haven & Hartford, repairs to 500 to 1000 box cars, bids asked.
Canadian National railroad, repairs to 2500 box cars; bids asked.
Union railroad, 50 flat cars; bids asked.
Nash, Watjen & Bangs, Ltd., New York, two tank cars, pending.

Japan Plans Large Works

Inquiries recently brought out for 4000 tons of structural steel for buildings for the Shibaura Engineering Works, Yokohama, Japan, indicates the magnitude of this recent undertaking. The steel inquiry is for the construction of three of the proposed 16 buildings which will comprise the new works. The three to be constructed first will be the machine shop, foundry and forge building. These will require more heavy steel each than the remainder of the buildings. H. K. Ferguson Co., Cleveland, has the general contract covering the construction of the 16 buildings.

The Nonferrous Metals

International Situation Is Big Factor in Ups and Downs—Copper Strong—Lead, Zinc and Tin Easy

	Copper Electro delivered	Copper Lake delivered	Spot Straits New York	Lead† New York basis	Zinc St. Louis basis	Spot† aluminum	Spot antimony	Nickel spot
June 13....	15.12½	15.37½	42.00	7.25	6.12½	26.00	6.75	29.00
June 14....	15.12½	15.37½	41.37½	7.25	6.07½	26.00	6.75	29.00
June 15....	15.18	15.37½	41.00	7.25	6.00	26.00	6.75	29.00
June 18....	15.18	15.37½	41.62½	7.25	6.00	26.00	6.75	29.00
June 19....	15.12½	15.25	40.12½	7.25	5.95	26.00	6.75	29.00

†Outside market quotation.

NEW YORK, June 19.—The Ruhr situation has continued a dominating influence on the world metal markets and accordingly the ups and downs in the outlook for a settlement of the reparations questions have exercised much effect on metal market sentiment here. The outlook was somewhat better last week and copper buying for export improved appreciably, followed by a good domestic business. Then on Monday the sky darkened again and business was light and continued so on Tuesday.

Zinc, lead and tin and all the important metals have been affected in some degree by the foreign situation and nearly all have been weak. Domestic consumption progresses with little if any abatement, but domestic buyers are moving conservatively, buying principally against actual early needs.

Following the good copper business last week, some of the large agencies advanced their prices ⅛ cent to 15.25c, but others continued to quote 15.12½c delivered. Outside prices were at a premium, both for export and for domestic account, up to 15.25c, f.o.b. refinery and f.a.s. being paid by dealers but today the market slumped. The statistical position of the copper market continues strong, May deliveries being reported as 190,000,000 pounds, foreign and domestic, against refined production of about 185,000,000 pounds. Casting copper fluctuated the past week between 14.75c and 14.87½c, refinery. Lake was quoted 15.37½c, delivered.

Zinc prices declined steadily, touching 6c, East St. Louis, for all positions by June 15, holding this price June 18. Demand has been light, with some accumulation of metal at smelters and consequent pressure to sell prompt shipment zinc. The American Zinc institute figures as of June 1 showed an increase in stock of nearly 5000 tons. However, at present prices for zinc ore and present selling prices for slabs, smelters claim to be unable to produce excepting at a loss and there is increasing resistance to the decline.

Lead has eased gradually, to 6.90c, East St. Louis, with comparatively little pressure to sell. Production has been decreasing somewhat and consumption has fallen off a little, so that the situation as regards supply and demand is little changed. London prices continue more attractive than New York prices, so Mexican and Spanish lead still is going to Europe, keeping the New York market steady at the Smelting company's official price of 7.25c, New York.

Tin has been decidedly weak, due to heavy Straits shipments, which amounted to 3100 tons the first half of June and if continued at such a rate will mean a reversal in the statistical position of the world tin market as of June 30. London has declined steadily and New York prices have dropped 2 cents a pound in 10 days. Spot was quoted 41.62½c June 18, futures ⅛ cent less and broke to about 40c today.

Aluminum has been slow, but steady, with ingot scarce in the outside market and commanding prices about 1 cent a pound above the regular quotations of the domestic producer, 25.00c for 98 to 99 per cent and 26.00c for 99 per cent.

Antimony has been quiet and easy at 6.75c, duty paid for spot carlots and 4.75c, c.i.f. Atlantic ports asked for importation.

Mill Products

Base prices cents per pound, f.o.b. mill

SHEETS	
Copper, hot rolled, 24 oz., min.	24.25
High brass	20.50
Zinc, ga. 9 to 18 (plates ½c less)	9.20
Lead, full sheets (cut ¼c more)	10.75
Aluminum, base 18 ga. and up...	35.40
SEAMLESS TUBES	
High brass	25.50
Copper	27.00
RODS	
High brass, round, ⅜ to 2½ inch	18.75
Naval brass rod	21.00
WIRE	
Copper	18.00 to 18.25
High brass	22.25

Old Metals

Dealers' buying prices cents per pound

HEAVY RED BRASS	
Cleveland	9.50 to 10.00
New York	9.25 to 9.50
Chicago	9.50
HEAVY YELLOW BRASS	
New York	6.50 to 7.00
Chicago	7.00
Cleveland	6.50 to 7.00
ZINC	
New York	4.25
Cleveland	3.00 to 3.50
HEAVY COPPER AND WIRE	
Cleveland	11.50 to 12.00
New York	11.50 to 12.00
Chicago	12.00
RED BRASS TURNINGS	
New York	8.75 to 9.00
Cleveland	8.50 to 9.00
Chicago	9.00
YELLOW BRASS TUBING	
Cleveland	6.50 to 7.00
NO. 1 BRASS ROD TURNINGS	
Cleveland	6.00 to 6.50
New York	7.00 to 7.25
Chicago	7.00
ALUMINUM BORINGS	
Cleveland	11.00 to 12.00

Foundry To Be Dissolved After 70-Year Career

The historic business of Isaac G. Johnson & Co., at Spuyten Dyvil, N. Y., on the Harlem river is to be liquidated and the company dissolved effective July 1. This company for many years was recognized as a leading producer of steel castings both as to quality and volume of output. It was established in 1853 by the late Isaac G. Johnson, who took his five sons into the business which now is being conducted by the surviving sons and grandsons. The officers are: President, E. F. Johnson; vice president, Isaac D. Johnson; secretary, James W. Johnson; treasurer, Gilbert H. Johnson. Originally, the plant produced gray iron castings. It turned to the production of malleable castings when malleable iron was invented. During the past 40 years it has been exclusively a steel casting plant. The cause of the discontinuance of business is the taking over of the property by the state of New York, under condemnatory proceedings, since the site is required to make room for the Harlem ship canal.

Pittsburgh Traffic Larger

Pittsburgh, June 19.—May records another increase in the monthly total of iron and steel products shipped over the waterway system of the Ohio, Monongahela and Allegheny rivers, the amount for that month being 47,110 tons, as compared with 42,725 tons for April and 33,482 for March. The May total is the largest since November, 1922, according to figures issued by the federal engineers of this city. The following table shows the monthly comparison of the river shipment of steel since the resumption of the shipments in May, 1922:

	Allegheny river	Monongahela river	Ohio river	Total
May	....	25,910	21,200	47,110
April	100	21,825	20,800	42,725
March	....	17,291	16,191	33,482
February	....	19,337	3,285	22,622
January, 1923.	....	26,997	1,030	28,027
December	1,100	24,350	18,850	44,300
November	4,420	28,475	22,851	55,746
October	4,420	19,380	24,726	48,526
September	....	21,970	6,538	28,508
August	....	23,545	16,977	40,522
July	....	25,633	9,880	35,513
June	....	33,675	16,600	50,275
May, 1922	....	28,112	16,765	44,877

Furniture Shipments Drop

Washington, June 19.—Shipments of steel furniture from stock in May were valued at $1,506,072 as compared with $1,520,286 for April and $1,056,735 for May, 1922, according to figures of the bureau of census. The following figures compare the shipments for the first five months of 1922 and 1923, as reported by 22 manufacturers:

	1923	1922
January	$1,362,470	$ 983,834
February	1,307,173	967,125
March	1,709,206	1,087,228
April	1,520,286	1,058,382
May	1,506,072	1,056,735

Small Lots Dominate Coast

Falling Off Noted in Large Orders—Demand for Reinforcing Bars Heavy—May Warehouse Heaviest in History

LOS ANGELES, June 16.—Although there has been a falling off in demand for large tonnages of such heavy material as plates and shapes in the past few weeks, mill representatives continue to receive orders for smaller lots which in the aggregate total a rather heavy volume. While the curtailment of production in the oil fields is being directly reflected in lessened activity among the manufacturers of oil well tools and equipment in this section and to some extent in other business channels, general business conditions are excellent.

Building permits issued in Los Angeles for the month of May numbered 5184 with a valuation of $18,926,881. This is the second largest month in history.

Pig Iron and Coke

Foundry operations in this district are estimated by Founders' and Employers' association, to be 40 per cent better than at this time last year. During the past week or two lower prices for foreign iron were noted and the Whiting-Mead Commercial Co. secured 1500 tons of British iron running 2.75 to 3.25 in silicon, 0.60 to 1.00 in phosphorus, 0.80 to 1.00 in manganese and 0.04 in sulphur at $34, duty paid, exvessel San Pedro. The Southern California Iron & Steel Co. recently placed with Bethlehem Steel Corp., 1000 tons of basic at a price understood to have been $35.75 delivered, San Pedro.

Bars, Plate and Shapes

Demand for both merchant and reinforcing bars is heavy and both of the local mills are operating almost to capacity. Present prices on reinforcing material are 3.50c f.o.b. warehouse on lots of 250 tons and 3.60c on lots less than 250 tons. Awards of reinforcing bars involving tonnages of over 100 tons during the past few weeks have aggregated close to 6000 tons.

Demand for plates for tank storage purpose has been exceedingly light and only one project of any size has been closed. This involved approximately 7000 tons of plates and shapes for 22 80,000-barrel tanks for the General Petroleum Corp. The Lacey Mfg. Co. has secured a pipe line job for the city involving 500 tons of 8 to 14 gage blue annealed while the Western Pipe & Steel Co. was recently awarded 1000 tons for another pipe line job for the city. During the past day or two several small lots of 100 tons have been sold at 2.85c Atlantic seaboard, equivalent to 3.15c exvessel San Pedro. This figure is considered the maximum while 2.75c Atlantic seaboard, or 3.05c San Pedro was recently secured on a fairly good sized tonnage. It is reported that universal plates were recently secured in San Francisco at 3.00c exvessel.

Structural shape activity continues unabated in this district and although several projects involving large tonnages have been temporarily held up, fabricators report a good volume of work on hand and much more in prospect. One of the largest projects pending involves between 6000 and 7000 tons for the Hall of Justice, bids on which will be opened July 2. Prices have softened somewhat and while 3.10c exvessel Pacific Coast ports is still being obtained, one large tonnage recently went at 3.00c.

Other Finished Material

The volume of new sheet business being placed is relatively small due to the fact that most consumers have covered for their third quarter requirements. Galvanized sheet prices are firm at 5.00c base Pittsburgh. On blue annealed, 3.00c base now represents the market, though a few of the independents are still quoting 3.25c but as far as can be ascertained no business has been placed at this figure. Recently three or four hundred tons of British blue annealed has arrived, the orders for it being classed as trial. It is understood the price named was 2.72c duty paid San Pedro.

Rail demand has been light of late and at the moment only one inquiry is before the trade. This involves 1000 tons of 112-pound girder and 250 tons of high Tee rail for the Los Angeles Railway Corp.

Warehouse Market

One of the largest jobbers in this district reports that May movement of out-of-stock material was the heaviest in its history and states that demand so far this month is equally as heavy. Buying by the smaller consumer is well sustained but not specially heavy and warehouse interests are of the opinion that this class of buyer is watching the market carefully in order that they may not become overstocked. Los Angeles out-of-stock prices have been revised as follows: Bars 4.30c, shapes 4.40c, plates 4.45c, blue annealed sheets No. 10 gage 5.20c, black sheets No. 28 gage 6.50c, galvanized sheets No. 28 gage 7.30c, bands 5.20c, cold rolled 5.25c, bright 4.50c, nails, cement coated 4.05c, boiler rivets 5.35c and structural rivets 5.25c. San Francisco prices are as follows: Bars 4.00c, shapes 4.10c, plates 4.10c, blue annealed No. 10 gage 5.25c, black sheets No. 28 gage 6.30c, galvanized sheets No. 28 gage, 7.15c.

Northwest Demand Good

SEATTLE, Wash., June 16.—The market with reference to iron and steel shows little change. Demand is well sustained, general business conditions are good and building continues active. Jobbers still report difficulty in getting prompt deliveries of new orders and as a consequence jobbers are short some items.

While 16 intercoastal steamship lines have agreed to the new tariff which increases the rates on all steel and iron products an average of 25 per cent, effective Aug. 1, the iron and steel trade has an intimation that some of the new companies are willing to continue handling freight on the present level, which is based on 30 cents per 100 pounds.

Pig Iron and Coke

While prices on the lower grades of pig iron are somewhat easier the higher grades remain firm, the best varieties of Belgian and United Kingdom iron selling readily in this market at $40, all paid. Recently some French iron has arrived at San Francisco where it is quoted at about $34. Foundries generally are busy and are buying as their needs require. About 1500 tons of high grade British and Scotch iron is enroute to Puget sound, orders being based on delivery in from 60 to 90 days.

Coke sales are holding up well and the market is steady. Fernie is supplying the bulk of the demand in this section. Recently some Connellsville has been brought in by rail. It is selling at $23.90 as compared with Fernie at $16.50.

The turnover in these items continues active. The local steel mill is operating two open-hearth furnaces, several small awards having been made recently for reinforcing bars. Two inquiries for reinforcing material were received from Hongkong recently and local mill interests forwarded quotations. The Wallace Equipment Co. was awarded the contract for furnishing a small order of steel for the towers of the city's Gorge Creek transmission line.

Other Finished Material

Jobbers report conditions satisfactory with no change in the situation either as to price or demand. Nails and spikes are in good demand but jobbers are having difficulty in getting deliveries. Jobbing houses are well stocked with sheets but this item is not moving as actively as was expected by this season. The cut of 50 cents in sheets is still in effect but sales have not been increased by the lower prices.

This market is off from $1 to $4. Dealers can attribute no reason except official warnings not to allow prices to run away. Country mixed steel is now about $14, a drop of $1 during the last two weeks. Selected grades have dropped $2 and are now quoted at $15 to $18. No. 1 cast iron scrap shows a decline of $3 to $4 and is now selling at $24 to $25 as compared to the peak of $30 during the early spring. The city recently sold 50 tons of cast iron at $22.35 and five tons scrap steel at $10. Japanese buyers are still looking for steel scrap but they are unable to close unless they find lots under the market. The same interests are purchasing re-rolling scrap rail which is fairly strong at $20. One lot of 500 tons was recently shipped to Japan.

Many Mills To Be Down

Numerous Sheet and Tin Plate Plants To Be Idle One to Two Weeks in July—Others To Run

Pittsburgh, June 19.—As in other years, sheet mills in this district will utilize the week during which Independance Day is celebrated to shut down their plants to make needed repairs, clear up congestions, etc. In some cases this will extend over one week; others two. Several tin plate manufacturers plan similarly, although the plants of the American Sheet & Tin Plate Co., both sheet and tin plate, will continue to operate at highest possible capacity. Some independents, too, will confine the shutdown to as limited a period as possible, owing to the fact that no lack of business confronts them and all have good order books, particularly on tin plate.

Mill operators report that after a long period of activity like that now prevailing the workmen have money and for a day or two before and for two or three days after a holiday it is difficulty to get them to come to work; hence they usually take this time to make necessary repairs.

The Canonsburg Steel & Iron Works, Canonsburg, Pa., will close its rolling department about a week for repairs; the Apollo Steel Co., Apollo, Pa., will close down its rolling mill department the first week of July because of the July 4 celebration but will run its galvanizing, pickling and finishing departments; the West Penn Steel Co., Brackenridge, Pa., will do likewise to make turbine repairs which have been postponed for several weeks; the Parkersburg Iron & Steel Co., Parkersburg, W. Va., will close down the sheet rolling and bar mills but not its finishing departments for the same period; the Wheeling Steel Corp. probably will do the same thing. Follansbee Bros Co., Follansbee, W. Va., will decide later whether it, too, will go down for one or two weeks for repairs.

While no definite decision has yet been reached the Allegheny Steel Co., Brackenridge, Pa., will probably shut down its sheet mill capacity for the first week in July. The Ashland, Ky., sheet mill of the American Rolling Mill Co. will shut down July 1 for a week but its Middletown, O., plant will shut down for July 4 only. Part of its Zanesville, O., sheet mill will be down from June 30 to July 14. All of the regular departments will continue to operate with the exception of the holiday.

Tin mill operations will not be greatly interrupted by the shutdown. The Jones & Laughlin Steel Corp. will probably close its 32 Pittsburgh mills for the week during which the holiday occurs as will the McKeesport Tin Plate Co. its 44 mills. The Standard Tin Plate Co., Canonsburg, with 3 mills may participate and the Follansbee Bros. Co. with 6 mills and the Wheeling Steel Corp. with its 32 will decide later. The Washington Tin Plate Co., Washington, Pa., however, will not close its 6 mills and the Weirton Steel Co. will keep its 50 mills active except for 24 hours over July 4.

Some Valley Plants Will Be Down Two Weeks

Youngstown, O., June 19.—Due to Independance Day caming in the middle of the first week in July most of the sheet and tin mills in the Mahoning valley plan to suspend operations June 30 to avoid an extra warming up turn which otherwise would be entailed in case suspension was undertaken for that holiday only. This will permit the taking of inventory and repair work to furnaces, driving units and mills. Some producers plan to close down their mills at the end of this week for a two-week shutdown. Present plans call for the resumption of all mills here during the evening of July 8.

Companies, which plan to suspend operations for one week, include the Trumbull Steel Co. with 15 sheet mills, the Republic Iron & Steel Co., with 17, the Sharon Steel Hoop Co. with 9, the Mahoning Valley Steel Co. with 8 and Youngstown Sheet & Tube Co. with 42. The Falcon Steel Co. and as far as known now the Newton Steel Co., will shut down their plants for two weeks beginning next week. The majority of bar, plate and the finishing mills in the district likely will not operate during the first week in July, although final decision in this direction will not be rendered until next week. Blast furnaces and open-hearths will continue active as is customary.

Newport To Close

Cincinnati, June 19.—The plant of the Newport Rolling Mill Co., Newport, Ky., will be down from June 30 to July 9. The suspension of operation is for the purpose of giving the employes a vacation. The rolling mill is now operating 18 mills, which represents 90 per cent production. The Andrews Steel Co., at Newport, will continue operation during July, having a large volume of orders which necessitate operation.

Chicago Keeps Up

Chicago, June 19.—Production of finished steel at Chicago is unchanged from last week, the Illinois Steel Co. and the Inland Steel Co. continuing at their former rates. It appears that this situation is likely to remain steady for several months. Western sheet mills do not plan to shut down in July but will run as full as labor supply will permit.

British Foundrymen

Meet in Annual Convention With Heavy Attendance

By Cable

London, June 18.—At the twentieth annual convention of the Institution of British Foundrymen which opened in Manchester, England, Wednesday, June 13, it was announced that the total membership is now 1609 compared with 1505 last year. The meetings were held at the Manchester College of Technology, and an unusually large number of members attended.

After addresses of welcome by W. Cundiff, lord mayor of Manchester, W. Clare Lees, president of the Manchester Chamber of Commerce and others, Oliver Stubbs, of Joseph Stubbs Ltd., Manchester, was installed in the chair as president for the ensuing year.

Other officers elected were: Senior vice president, R. O. Patterson; junior vice president, E. H. Broughall; honorary treasurer, F. W. Finch, re-elected; secretary, Hollinworth, re-elected; new members of the council, J. Cameron, W. J. Evans, J. Haigh, Ambrose Firth, C. Carey Hill and J. G. Robinson. The name of the organization was changed to Institute of British Foundrymen. The Foundrymen's congress to be held in Paris in September was emphasized and hope expressed large number of Americans would attend. A cablegram of greetings was sent to the American Foundrymen's association.

Among the first of the papers presented was the official exchange paper from the American Foundrymen's association, by R. A. Bull, director, Electric Steel Founders Research Group, Chicago, entitled "The Manufacture of Steel Castings in the United States." In the unavoidable absence of Mr. Bull this paper was read by H. Cole Estep, European manager of IRON TRADE REVIEW. Mr. Bull's paper constitutes a broad survey of steel castings production in the United States dealing with the manufacture of open-hearth, converter crucible, and electric furnace castings. The paper received an unusually warm welcome.

Prepare for Long Tieup in Ruhr

French Taking Measures To Obtain Coke for Winter—Germans Able To Hold Out Through Summer—Minimum Amount of Steel Being Shipped—British Exports in May Set New High Figure of 435,000 Tons

Iron Trade Review Staff Cable

European Headquarters,
IRON TRADE REVIEW,
2-3 Caxton House, Westminster, S. W.1

LONDON, June 19.—An early break in the Ruhr deadlock is unlikely, the latest developments confirming previous declarations appearing in IRON TRADE REVIEW staff reports. The Germans can hold out through the summer, while the French are actuated solely by political considerations showing little regard for economic business factors. The British government is anxious for a businesslike settlement but is unlikely to be able to reach an agreement with France. A minimum amount of steel is being shipped out of the Ruhr district. The French correspondent of IRON TRADE REVIEW wires from Paris:

"The French are taking measures to obtain supplies of coke for the winter on the assumption that the Ruhr question will be unsettled. The government's coke price for July will be maintained at 180 francs ($11.16), this price giving an opening for further American imports. Importers of American electrical sheets have been severely undercut by Joseph Sankey, Ltd., the leading British producer."

Some renewal of activity has developed in the iron and steel markets. French and Belgian quotations to British buyers, however, still are sagging and shipments considerably exceed new orders. Recent reductions in steel prices average 7 shillings 6 pence ($1.73). Consumers in the Midland are placing orders with continental producers claiming that home prices preclude business. Belgians are offering beams at £7 15s ($35.84) and billets at £6 ($27.75) f.o.b. Antwerp.

Exports of iron and steel in Great Britain in May totaled 435,600 tons, including scrap, this figure being a new record. Current exports are not being sustained at this level. Exports in April, not including scrap, amounted to 398,507 tons; in March, 368,072 tons; February, 301,000 tons and January, 353,000 tons. Imports of iron and steel in Great Britain in May amounted to 114,000 tons compared with 133,929 in April; 110,965 in March; 118,000 in February and 129,000 in January.

Price changes in the week in the British iron and steel market bring the following products to the levels as quoted: Scotch plates, £9 ($41.63); Scotch and English beams, £9 5s ($42.78); West Coast hematite, £5 17s 6d ($27.17); Middlesbrough No. 3 pig iron £5 15s ($26.59).

Sterling exchange is figured on a basis of $4.625.

British Pig Iron Prices Reduced in Dull Market

European Staff Special

Office of IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,

BIRMINGHAM, England, June 8.—The most important reductions in pig iron prices recorded during the present temporary lull were made this week. All the Middlesbrough brands of pig iron were reduced at the Birmingham market held June 5. No. 3 now is quoted at £5 17s 6d ($26.14), and other brands were reduced in proportion. Mixed numbers and East Coast hematite share in the reduction and are quoted at the same figure. Scotch prices have been steadily reducing for the past two or three weeks, and are substantially on the north eastern basis. Midland pig irons are easier, reductions bringing Derbyshire prices to £5 5s ($24.25) and Northampton to £5 2s 6d ($23.67), although slightly higher prices are nominally quoted. The Midland reductions still leave a margin of 10 shillings ($2.31) as compared with those of the north of England, these blast furnaces not having shared in the rapid upward movement of a few months ago.

Sterling—$4.62

Two factors have obviously brought about the northeastern reduction. Furnace owners are becoming rather anxious about the autumn production and it was decided to encourage buying at a sacrifice. Cokemakers have made a little concession, fuel being obtainable at £2 3s ($9.93) delivered from the Durham ovens.

Possibly, a more material consideration arises from the very unsatisfactry exports of pig iron for May which make the poorest showing for 16 months. The exports of pig iron from the Tees, including Skinningrove on the coast, amounted to 32,467 tons, compared with 54,435 tons in April and 67,636 tons in March. To America 41,281 tons was exported equal to about the tonnage of the previous month.

The Barrow area has the advantage of recent improved bookings which have placed the furnaces in a comfortable position in regard to summer business, the general estimate being that there is sufficient work on hand to absorb the output for the next three months. But a new spirit of caution has developed, apparently due to an indication of approaching settlement in the Ruhr. It seems to be assumed that a settlement will bring an immediate drop in prices. America continues to be a good buyer of manganese from the district.

The strong pressure exerted on the steelworkers has not yet had much effect. The north eastern mills are sending out good tonnages, and hardly any large steelworks seems to be in urgent need of business. Order books are sufficient to see most of the mills through July The steelworks still are benefiting from the fairly heavy railway business placed some time ago, and a moderate aggregate of constructional undertakings makes a respectable miscellaneous tonnage. The rail mills at Barrow and Workington, in Cumberland, continue busy on overseas orders. The Clyde steelworks are feeling to an increasing extent the effect of the shipyard strike, and business there is of a hand-to-mouth character, specifications being slow and

Current Iron and Steel Prices of Europe

Last Reported Prices Converted into Dollars at Rates of Exchange, June 18

British Market

Home Market Prices. Gross Tons at Works or Furnace

Corrected to Date by Cable

	$	£ s d
SEMIFINISHED STEEL		
Billets, soft steel	35.84	7 15 0
Sheet bars	35.84	7 15 0
Wire rods	55.50	12 0 0
FINISHED STEEL		
Steel bars, England, ⅝ to 3-inch	46.25	10 0 0
Steel bars, England, ⅜ to 3-inch, for export	43.94	9 10 0
Plates, ship, bridge and tank, England	42.78	9 5 0
Plates, ship, bridge and tank, Scotland	41.63	9 0 0
Beams, England	42.78	9 5 0
Beams, Scotland	42.78	9 5 0
Sheets, black, 24 gage	57.81	12 10 0
Sheets, galvanized, 24 gage	55.50	12 0 0
Rails, 60 pounds and over	46.25	10 0 0
Rails, 60 pounds and over, for export	43.94	9 10 0
Tin plate, base box, 108 pounds	5.32	1 3 0
Steel hoops	55.50	12 0 0
Steel hoops, for export	54.34	11 15 0
PIG IRON		
Hematite, East Coast, Mixed Numbers	27.17	5 17 6
Hematite, West Coast, Mixed Numbers	27.17	5 17 6
Basic Middlesbrough	26.59	5 15 0
No. 3 Foundry, Middlesbrough	26.59	5 15 0
No. 3 Foundry, Derby, Leicester, Nottingham	24.28	5 5 0
No. 3 Foundry, Northamptonshire	23.70	5 2 6
No. 3 Foundry, Staffordshire	24.28	5 5 0
No. 3 Foundry, Scotch	25.44	5 10 0
Ferromanganese, 76 to 80 per cent	83.25	18 0 0
Ferromanganese, 76 to 80 per cent, for export	92.50	20 0 0
COKE		
Yorkshire furnace	6.48	1 8 0
Yorkshire furnace, for export	12.72	2 15 0
Yorkshire foundry	8.09	1 15 0
Yorkshire foundry, for export	12.72	2 15 0

Where no separate export prices are given, same quotations apply to domestic and foreign business.

German Market

Prices Last Reported

	$	Marks per metric ton
PIG IRON		
Hematite, Oberhausen	10.39	1,630,000
Foundry, No. 3, Oberhausen	10.18	1,597,000
Bessemer Stahleisen, Siegen	10.16	1,594,000
Foundry, No. 1, Oberhausen	10.20	1,600,000
Luxemburg Foundry		nominal
COKE		
Ruhr furnace	2.07	324,900
Ruhr foundry	2.16	338,700
SEMIFINISHED STEEL		
Billets	14.34	2,250,000
Sheet bars	14.66	2,300,000
Wire rods	14.18	2,225,000
FINISHED STEEL		
Standard rails	15.62	2,450,000
Merchant bars	17.09	2,680,000
Structural shapes	17.21	2,700,000
Ship plates	17.05	2,675,000
Medium plates, 3 to 5 millimeters	18.17	2,850,000
Sheets, below 3 millimeters	20.08	3,150,000
Tin plate		nominal
Plain wire	17.85	2,800,000
Bands and strips	18.49	2,900,000

All prices are f.o.b. furnace or mill.

French Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Hematite, Lorraine	30.07	485
Basic bessemer, Lorraine	27.28	440
Foundry, Longwy, No. 3, sand-cast	26.35	425
Foundry, Longwy, No. 3, chill-cast	27.28	440
Ferromanganese, 76 to 80 per cent	96.10	1,550
COKE		
French furnace	8.37	135
German furnace, f.o.b. frontier*	11.16	180
German furnace, f.o.b. frontier**	15.50	250
French foundry	8.99	145
SEMIFINISHED STEEL		
Blooms	31.00	500
Billets	33.48	540
Sheet bars	43.40	700
FINISHED STEEL		
Standard rails	34.10	550
Merchant bars	41.54	670
Angles	40.30	650
Normal beams and profiles	40.30	650
Plates, ship and tank, 10 millimeters and thicker	47.74	770
Plates, bridge and tank, 5 to 10 millimeters	48.98	790
Sheets, black, 3 millimeters	51.46	830
Sheets, blue annealed, 2 millimeters	55.80	900
Shafting, cold-drawn, 40 to 60 millimeters	86.80	1,400
Bars, 2 per cent nickel steel	136.40	2,200

All prices are f.o.b. furnace or works.
*Up to 50 per cent of normal requirements.
**Over 50 per cent of normal requirements.

Belgian Market

Prices Last Reported

	$	Francs per metric ton (2205 lbs.)
PIG IRON		
Basic bessemer, Belgian	19.95	380
Basic open-hearth, Belgian	28.61	545
Gray forge, Belgian	14.18	270
Foundry, No. 3, Belgian	23.63	450
Foundry, No. 3, Luxemburg	23.10	440
Foundry, No. 3, Lorraine	23.10	440
SEMIFINISHED STEEL		
Blooms	26.25	500
Billets	27.56	525
Sheet bars	28.88	550
Wire rods	38.06	725
FINISHED MATERIAL		
Standard rails	38.06	725
Merchant bars	30.71	585
Normal beams and profiles	30.45	580
Plates, 5 millimeters and thicker	35.18	670
Sheets, black, 3 millimeters	37.28	710
Sheets, galvanized, 1 millimeter	89.25	1,700
Plain wire	60.38	1,150
Galvanized wire	68.25	1,300
Wire nails	63.00	1,200

All prices are f.o.b. furnace or works.

new orders insufficient to replace those worked off.

Rerolling works have bought Belgian billets at £7 10s ($34.65) delivered, although this is far from being a general price. There still is considerable lack of confidence in foreign guarantees of delivery.

For the present semifinished steel in this country seems to have reached the limit of reduction. The minimum price is £8 10s ($39.27), substantially that of a week ago. The great majority of the works want £8 15s ($40.42), and one leading establishment, which quoted this figure a week ago, has lifted its quotation to £9 ($41.58).

Staffordshire ironmasters are feeling increasingly the keen competition in steel. Steel skelp can be bought at £11 15s ($54.28) or about £1 ($4.62) cheaper than iron. The keen competition in the international markets encountered by the tubemakers leaves them no alternative but to take steel. The decision arrived at a few days ago by the Scotch malleable ironmakers to reduce their prices 10 shillings ($2.31) per ton to a level of £12 ($55.44) has increased the competition with South Staffordshire, and although the nominal figure for unmarked bars is maintained at £12 10s ($54.45) it is possible to buy down to £12 ($55.44).

The ironmasters are feeling the pinch of the additional 7½ per cent in wages which they have to pay under the recent sliding scale award. Various warehouses are making moderately good sales of iron and steel, and may be better customers in the near future.

Steel sheets are slightly easier at £13 10s ($62.37) to £14 ($64.68) at the works and there is a moderate demand, on behalf of the automobile industry and to meet various stamping requirements. The galvanized hollow ware trade is practically stagnant, with prices unremunerative. An effort made a short time ago to raise prices by a united action proved a complete failure. The galvanized sheet trade maintains an excellent volume of output, the largest works in particular being very well off for orders. Prices are rather easier at a minimum of £19 ($87.78), the makers being able to give their customers the advantage of somewhat cheaper sheet bars, while spelter prices have a downward tendency.

The tin plate trade is a little better, and the general price average may be quoted as £1 3s 4½d ($5.39) f. o. b. works port. Some little revival is taking place in continental and South American buying.

To finance the purchase of new au-

tomatic machinery, provide for later expansion and to retire a note issue of $2,800,000, the A. O. Smith Corp., Milwaukee, manufacturer of pressed steel frames and forgings for the automobile trade, is issuing $5,000,000 in 10-year first mortgage bonds secured by a trust deed to the First Wisconsin Trust Co., as trustee.

Only German Coke Will Do, French Say

European Staff Special

Office of IRON TRADE REVIEW,
23 Rue de la Bienfaisance

Franc—$0.065

PARIS, June 8.—French metallurgists are making every effort to overcome the handicap of the present coke shortage. Domestic coke production has been increased and foreign markets have been studied, but it is more and more evident that Germany is the only logical source of supply. Until Germany again resumes deliveries of combustibles to France regularly and in sufficient quantities. The French realize they cannot hope to occupy a position of importance in the world markets. At the end of December 1922, 116 blast furnaces were blowing in France. Since that time due exclusively to the coke shortage, 28 have had to be blown out. Certain blast furnaces report they can employ American coke up to 40 per cent of the charge, while others limit the charge of 15 per cent American and 85 per cent European. The last English coke offered to French consumers was quoted at 63 shillings c.i.f. Dunkirk, 10 francs ($0.65) to 20 francs ($1.30) higher than American coke of similar quality. Imports of Belgian coke have been checked by the railroad strike in Belgium.

The pig iron market is quiet and prices are weaker. No. 3 chill cast foundry has been sold as low as 400 francs ($26) f.o.b. furnace. Hematite prices are steady and range from 450 francs ($29.25) to 480 francs ($31.20) depending upon the region.

Semifinished steel prices are slowly falling back to old levels. Open-hearth blooms and billets are now quoted around 450 francs ($29.25). Merchant bars are approaching 600 francs ($39). The mills are seeking tonnage. One of the French colonies has placed an order for 680 tons of 57-pound rails, Standard Vignole, at 527.50 francs ($34.30) f.o.b. Dunkirk.

The strike in Belgium has strengthened the position of French platemakers. The downward trend of prices has been checked. Tank plates are quoted at 700 francs ($45.50) per metric ton. Open-hearth steel boiler plates 8 to 10 millimeters are offered currently at 800 francs ($52). Black annealed sheets 0.6 to 0.8 millimeters are quoted at 1200 francs ($78) per metric ton f.o.b. mill. English sheets are competitive in the French market at this price. An order for 950 tons of spikes has been divided by three northern manufacturers at 1010 francs ($65.60) per metric ton.

On May 1, 88 furnaces were operating in France as compared with 77 on April 1, 90 on Feb. 17, and 116 on Jan. 1. The number of stacks in course of construction or being repaired on May 1 was 46.

Pig iron production during April amounted to 350,485 tons or 34,339 tons more than produced in March. Production of basic bessemer iron in April amounted to 230,494 tons; foundry iron, 74,949 tons; refining iron, 23,967 tons; acid bessemer iron, 1328 tons; special grades, 19,747 tons. Lorraine's contribution to the total tonnage was 103,792 tons as against 88,652 tons during March.

The April output of steel ingots and castings amounted to 354,791 tons, or 38,984 tons more than in March. In Lorraine, the total steel production amounted to 94,561 tons in April as compared with 79,222 tons in March. These figures show an improvement in the iron and steel production generally, due to the increased receipts of coke from the Ruhr, as well as to arrivals of imported coke from England and the United States, and to the increased output of the French coke ovens. Further details of production follow:

	Pig iron metric tons	Steel ingots and castings metric tons
Monthly average 1912....	405,000	363,000
Monthly average 1913....	427,000	385,000
Monthly average 1921....	280,300	254,500
Monthly average 1922....	427,550	372,606
January, 1923	486,210	407,731
February	305,526	289,787
March	316,146	315,807
April	350,485	354,791

Germany Buying More American Coal

European Special Service

Mark—$0.000012

DUSSELDORF, Germany June 7.—There has been renewed buying of American coal on German account and the following charters have been fixed: 12,000 tons to Hamburg in two cargoes at a vessel freight of $2.25 a ton, with 12,000 tons additional to the same destination at $2.15 a ton. There is no buying of coke or iron and steel products.

Prices have been advanced all along the line but the market has fallen so heavily that current quotations expressed in German currency have little significance. Further advances undoubtedly will take place until world price levels are more closely approximated. Hematite pig iron is now sold at 1,630,000 marks per ton ($19.90) with No. 3 foundry 1,597,000 marks ($19.50). The foregoing is for pig iron made from German ore and coke. For pig iron manufactured partly with foreign coke, 2,069,000 marks ($25.20) per ton is asked for hematite and 2,036,000 marks ($24.80) for No. 3 foundry. Ruhr foundry coke, of which only limited tonnages are available, is 324,900 marks ($3.95) with billets 2,250,000 marks ($27.50) and bars, plates, and shapes 2,680,000 to 2,700,000 marks a ton, the latter being equivalent to 1.49c to 1.50c per pound.

Future developments depend entirely on the reception of the recent German proposal for the settlement of the reparations question.

Despite laws to the contrary, business men are rapidly leaving the mark to its fate and quoting only in dollars or sterling, but for many inland transactions marks must be employed. Production in the Ruhr remains at an exceedingly low ebb. A little Ruhr steel is beginning to trickle out down the Rhine but up to date no heavy tonnage has been moved owing to red tape connected with export permits which are now obtainable under certain conditions from the French authorities.

In unoccupied territory buying has been stimulated by the fall in the mark, merchants and consumers being anxious to convert their worthless currency into commodities of stable value.

Railway rates again have been increased 100 per cent and skilled workers' wages have been advanced to 4000 marks per hour. In view of the depreciation in the currency these changes have little significance. The government continues to pay 66 per cent of the wages and salaries of the workmen in the occupied territory, using the newly printed marks for the purpose. The passive resistance program is supported from Berlin and is still effective.

Tin Prices Drop in Wales; Exports Heavier

European Special Service

Sterling—$4.63

Cardiff, Wales, June 7.—With a decrease in prices and an anticipated further reduction, business at the present time is quiet in the South Wales tin

plate trade, and exports are confined to the Continent and South America. The decrease in the cost of tin plate was brought about by a decrease in the association price of tin plate bars from £10 to £9 2s 6d ($46.30 to $42.25), subject to the customary rebate of 7 shillings and 6 pence ($1.73) to tin works. Tin plate was subsequently reduced to the base price of £1 3s 1½d ($5.35) a drop of 10½ pence ($0.21) from the previous minimum. With prices of raw materials easier, further reductions in tin plate are expected in the near future.

Ruling prices are: Cokes, 14 x 20 inches, £1 3s 6d to £1 4s ($5.50 to $5.55) per base box; cokes, quarters, £1 4s 9d to £1 5s ($5.73 to $5.79); cokes, 10 x 20 inches, £1 14s 9d to £1 15s ($8.04 to $8.09); cokes, 20 x 28 inches, £2 8s to £2 8s 3d ($11.10 to $11.16), ternes, 20 x 28 inches, £2 4s 3d to £2 4s 6d ($10.24 to $10.30). The price of galvanized sheets is unchanged at from £19 to £19 10s 6d ($386.70 to $389.13) for 24 gage corrugateds in bundles. Nickel is steady at £135 ($625.05) a gross ton for home and export business although foreign metal is £5 ($23.15) lower.

There is a depression in the scrap market where the prices per gross ton are as follows: Heavy melting steel scrap, £4 10s to £5 ($20.83 to $23.15); bundled steel scrap and shearings £4 to £4 15s ($18.52 to $21.98); steel turnings £4 5s ($19.67); mixed wrought iron and steel scrap, £4 5s to £4 10s ($19.67 to $20.83) for heavy and £2 5s ($10.41) for light material, heavy cast iron scrap £4 to £4 5s ($18.52 to $19.67) and good machinery scrap £4 to £4 10s ($18.52 to $20.83).

Shipments from the Welsh ports during the week ended May 18 were fairly good, tin plate exports totaling 10,447 tons in comparison with 11,939 tons during the previous week. Black plate and sheet amounted to 6491 tons against 7776 tons, but in galvanized sheets there was an increase in the tonnage from 1363 to 2672 tons. The biggest decrease was in the miscellaneous iron and steel goods section, the figures for which fell from 4414 tons to 2904 tons.

Railroad Strike Cripples Belgian Trade

European Staff Special

BRUSSELS, June 8.—The railroad strike has been a severe blow to Belgian industry. Transportation has been practically paralyzed for two weeks. Moreover the strike caught the blast furnaces and mills unprepared, as stocks of raw materials were low due to the policy of hand-to-mouth buying since prices advanced to high levels early in the year. Work is now being resumed, however, but the mills are confronted with empty order books. This is leading to keen competition for new business and prices are rapidly falling back to old levels.

The demand for pig iron is quiet. Exporters of foundry iron claim to have received offers as low as 380 francs ($22.80) although this information is unconfirmed. The domestic price for this product ranges from 445 francs ($26.70) to 465 francs ($27.90).

Sales of semifinished steel products have become extremely difficult as English buyers have fixed the limits at which they are willing to place their orders, and despite their need of tonnage Belgian manufacturers refuse to consider the terms offered. The loss of export business is serious. Prices range about as follows: Billets, 525 francs ($31.50); blooms, 500 francs ($30.); ingots, 440 francs ($26.40); sheet bars, 525 francs ($31.50); skelp, 850 francs ($51.), all per metric ton for basic bessemer quality.

Building has been halted in Belgium by high prices. Structural shapes, plates, and other building material are in little demand. Stocks of German steel have been seized in the occupied region as penalties for nonpayment of fines, etc. Six hundred of billets for plates; 200 tons of billets for bands: 1500 tons of billets for sheets and 3000 tons of billets for hoops which were seized at the Rhenische Stahlwerke will soon be offered for sale in Belgium.

The trade treaty which Belgium has just signed with France again has brought up the question of a certificate of origin. This was one of the most delicate problems encountered during the negotiations. The French naturally wish to prevent German goods from leaking into France through Belgium by camouflaging the origin. The present tariffs on German goods entering France are practically prohibitive and there is great danger for this reason of intermediaries working German goods into Belgium, and later exporting them as Belgian goods by making false declarations. Measures are being taken by France to establish a control which will prevent this.

Franc—$0.06

On May 1, 35 blast furnaces were operating in Belgium, one less than on April 1. The total pig iron output for April was 172,280 tons, 2360 tons more than in March.

Production of steel ingots and castings in April amounted to 165,100 tons, or 12,830 tons less than during March. The production of finished steel products was 145,620 tons, or 11,550 tons less than during March. Further comparisons follow:

	Pig iron, metric tons	Steel ingots and castings, metric tons
Monthly average 1912....	192,000	206,000
Monthly average 1913....	207,058	205,452
Monthly average 1921....	73,032	65,876
Monthly average 1922....	133,635	130,304
January, 1923	165,210	178,560
February	151,340	156,300
March	160,920	183,970
April	172,280	165,100

Little Scrap Being Moved

(*Concluded from Page* 1790)

Nashville railroad closed with a list aggregating 10,000 tons of which 3000 came into this market; the remainder was distributed in Youngstown, O., and Portsmouth, O. Dealers have more material on hand than they can take care of advantageously. Consumers of steel scrap are out of the market. The bulk of the trading is among dealers. The present slump in prices is due almost entirely to the fact that the recently reported scarcity of scrap was much overestimated. The melt continues heavy.

Little Material Is Moving

St. Louis, June 18.—With offerings large and buying by the industries virtually at a standstill, the market for iron and steel scrap continues dull and weak. Mills and foundries apparently are well supplied and it is next to impossible to interest them in any variety of material, regardless of price. Dealers report numerous requests to slow down on deliveries, and has been the case for a month or more, the number of reections is considerably above normal.

The extremely low prices are beginning to tempt the yard interests, several of which are beginning to take on tonnages for laying down. Generally sentiment among the dealers is more optimistic. They believe that with the melt continuing at its present rate there is almost certain to be a revival of buying by the end of July or early in September. During the past two weeks the rolling mills have booked some excellent business, and since the first of June considerable improvement has been noted in new orders for gray iron castings.

The railroads still are marketing their scrap in heavy volume, new lists before the market including the following: Missouri, Kansas & Texas, 1800 tons; Louisville & Nashville, 8000 tons; Frisco 50 cars; Southern, 1000 tons, and several smaller lists by other western roads. The movement from the country has subsided almost to the vanishing point, and generally country yards are well depleted.

Market Dead in South

Birmingham, Ala., June 18.—The scrap market in the South is listless and Birmingham dealers assert that if there were no old contracts on hand on which delivery will continue for two months yet at least, there would be no activity. A little inquiry is being received for cast scrap but all other grades are slow. Quotations have weakened further. Many of the larger consumers of old material are holding off in their buying until their present orders have been filled. Scrap dealers report that scarcity of labor is having an effect on the market. The railroads are unable to get all the labor needed to sort their large quantities of scrap and therefore are throwing it on the market in bulk. On the other hand dealers are unable to buy this unassorted scrap and take the chances of assorting and preparing it for the market. The great bulk of railroad scrap has had a weakening effect on the general market.

Scores Explain Price Practice

Hearings on Basing Point Case Concluded at Pittsburgh with Taking of Testimony of Nearly 50 Witnesses—No Collusion in Methods, Is Claimed—Inquiry Resumed at Detroit

PITTSBURGH, June 19.—Testimony of almost 50 witnesses was taken in Pittsburgh in the hearings of the basing point case of the federal trade commission against the United States Steel Corp. The hearings began Wednesday, June 6 and continued to Saturday June 16 when they were adjourned to be resumed June 18 at Detroit.

Witnesses were called by W. W. Corlett representing the Steel corporation in an effort to show that considerable tonnage of steel is shipped into the Chicago territory to make up for the lack of sufficient production by the mills in that district. The purpose also was to show that prices were not always the same and that there was no collusion in the Pittsburgh basing point method of quoting.

Objection was taken to the statements of tonnages shipped into certain prescribed territory, on the ground that they included shipments to jobbers, the ultimate destination of which was not known and also because the particular commodity listed often was not competitive.

J. I. Andrews, general manager of sales, American Sheet & Tin Plate Co. gave a list of sheet and tin plate competitors covering the entire country. He said that often, despite lower prices offered by independent producers in competition, his company could obtain all the business it wanted; that since 1918 it has been a matter of allocation rather than the taking of orders. Asked as to why this was the case, he said that the Steel corporation had a reputation for square dealing among steel consumers all over the country, and many preferred an assured source of supply to lower prices. He pointed out that at various times his company's quotations were considerably lower than the prices obtained by nonintegrated makers under certain market condition when premium prices were available.

F. L. Kennedy, manager of sales, West Penn. Steel Co., Brackenridge, Pa., stated that since 60 per cent of his mill's output of specialty sheets is sold in Detroit, little tonnage remains for the Chicago and other markets.

E. R. Crawford, president, McKeesport Tin Plate Co., Port Vue, Pa., gave details of tin plate manufacture. He explained that because consumption is seasonal, prices often are established for long periods, and contracts are taken for several months' supplies. He said in times of small demand prices often descended below the level of the American Sheet & Tin Plate Co., and in times of good demand, they often were above it.

J. J. Watson, general manager of sales, Weirton Steel Co., Weirton, W. Va., stated that while the freight rates from Weirton and Steubenville, O., were generally the same as the Pittsburgh rates, the rates from the Weirton Steel Co.'s Clarkburg, W. Va., mill were higher to the West than were those from Pittsburgh, although they were lower to eastern points.

W. H. Abbott, vice president in charge of sales, Wheeling Steel Corp., Wheeling, W. Va., stated that while generally the same prices prevailed on sheets and tin plate for the same class of delivery, prices often were at variance. He said that the Pittsburgh base price was a convenience and that he hardly would know how to instruct his sales force without it.

H. T. Gilbert, vice president, Sharon Steel Hoop Co., Sharon, Pa., stated that it was his experience there was a greater differentiation in sheet prices than almost on any other product.

H. B. Miller, secretary, Otis Steel Co., said that often it was possible to get higher prices than obtained by the Carnegie Steel Co., because of delivery and service. He stated it was a policy of his company never to cut or waive the sheet extras.

Fred Beach, manager of sales, Mansfield Sheet & Tin Plate Co., Mansfield, O., said that his company sells f. o. b. Mansfield with freight equalized with Pittsburgh, and by that method gains in one direction, while the gain is offset when shipping in another direction.

Lloyd Booth, president, Falcon Steel Co., Niles, O., and Falcon Tin Plate Co., Canton, O., said higher figures than the corporation's could be obtained when space was open for rollings and quicker deliveries could be given.

A. J. Krantz, general manager, Reeves, Mfg. Co., Dover, O., stated that Dover takes a different freight rate to points east and west than does Pittsburgh, and that prices met in competition were irregular depending entirely upon market conditions.

F. A. Moeschle in charge of sales, Newport Rolling Mill Co., Newport, Ky., stated that he often was able to obtain prices higher than the Steel corporation's in a seller's market.

J. M. Schlendorf, in charge of sales, Central Steel Co., Massillon, O., said that while on shipments to Detroit, quoting Pittsburgh base, his company had an advantage of about 2½ cents, in the freight on shipments to Syracuse or simliar points east, it had a similar disadvantage.

C. F. Mackey general manager, Franklin Steel Works, Franklin, Pa., stated that often when market conditions are good he could get business in Chicago on a straight f. o. b. mill figure, on account of ability to make deliveries.

Others who submitted testimony were: M. C. Blair, auditor, West Penn Steel Co.; C. H. Forster, treasurer, Superior Steel Corp., Carnegie, Pa.; John F. Hazen, general manager of sales, Pittsburgh Steel Co., Pittsburgh; A. E. Morse, assistant general manager of sales, Weirton Steel Co.; E. M. McKelvey, in charge of records, Wheeling Steel Corp.; Harry T. Gilbert, vice president and J. Reid Evans, secretary and treasurer, Sharon Steel Hoop Co.; James O. Carr, vice president, and Frank H. Stephens, secretary and auditor, Allegheny Steel Co., Brackenridge, Pa.; G. W. Hanna, president in charge of sales, Washington Tin Plate Co., Washington, Pa.; John F. Kraft, treasurer, Washington Tin Plate Co., Washington Pa.; Samuel Davey, general manager, Mansfield Sheet & Tin Plate Co.; William M. McFate, vice president, Trumbull Steel Co., Warren, O.; John Follansbee, vice president in charge of sales, Follansbee Bros. Co., Pittsburgh; Samuel E. Eldridge, assistant vice president, and Lesile F. Raine, statistician, American Rolling Mill Co., Middletown, O.; Earl J. Ainsworth, comptroller, Newport Rolling Mill Co.; E. G. Haines, assistant secretary Canonsburg Steel & Iron Works, Canonsburg, Pa.; James Lippincott, president, and M. W. Leech, assistant manager of sales, West Leechburg Steel Co., West Leechburg, Pa.; H. D. McKnight, traffic manager, Newton Steel Co., Newton Fall, O.; W. J. Creighton, comptroller. Robert Geddis, manager of sales, hot-rolled department, E. D. Batchelor, manager of sales, wire department, and P. Schaeffer, manager of sales, tin plate department, Jones & Laughlin Steel Corp., Pittsburgh; J. B. Kessler, general agent in charge of order department, and W. G. Clyde, vice president, general manager of sales, Carnegie Steel Co., Pittsburgh; R. J. Hadley, auditor, American Sheet & Tin Plate Co.; W. W. Williams, general maner of sales, Pittsburgh Crucible Steel Co.

IRON TRADE REVIEW

Registration Applied for

The Authority of Industry National and International

Published Every Thursday by

THE PENTON PUBLISHING CO., CLEVELAND, O.

Member, Audit Bureau of Circulation. Associated Business Papers, Inc., and National Publishers Association

BRANCH OFFICES

BOSTON - - - - - - - - - - - 426 Old South Bldg.
CHICAGO - - - - - - - - - - 1147 People's Gas Bldg.
CINCINNATI - - - - - - - - - 504 Edwards Bldg.
NEW YORK - - - - - - - - 2203-2206 No. 220 Broadway
PITTSBURGH - - - - - - - - 2148-49 Oliver Bldg.
SAN FRANCISCO - - - - - - - 675 Monadnock Bldg.
WASHINGTON - - - - - - - - 84 Home Life Bldg.

FOREIGN OFFICES

BIRMINGHAM, ENG. - - - - - - - Prince's Chambers
LONDON, ENG. - 2-3 Caxton House, Westminster, S. W. 1
PARIS, FRANCE - - - - - 23 Rue de la Bienfaisance

Cable Address, IROTRAPEN, London, IROTRAPI, Paris

Subscription, United States, Cuba and Mexico, $6 per year. Canada, $8.50 per year. Great Britain and other countries, £2:0:0 per year.

Entered at the Postoffice at Cleveland as Second Class Matter

Copyright 1923 by The Penton Publishing Co.

IN THIS ISSUE

June 21, 1923

IRON AND STEEL MARKET REVIEW..... 1785
IRON AND STEEL MARKETS.....1786 to 1798
IRON AND STEEL SCRAP PRICE.....1789, 1840, 1844, 1848
PREPARE FOR LONG TIEUP IN RUHR..... 1801
FOREIGN MARKETS .....1801 to 1804
SCORES EXPLAIN PRICE PRACTICE..... 1805
MANY EVENTS ARE CONSTRUCTIVE..... 1808
BUSINESS TREND .....1809 to 1812
BRICK COLUMN LIFTS FURNACE TOP..... 1813
Shell Rivets on an Eastern Pennsylvania Stack Are Sheared and the Entire Top Rigging Elevated by Excessive Pressure Caused by Amorphous Accumulation Between Wearing Plates—Investigation Discloses Important Data
WILL COMPILE SCIENTIFIC TABLES 1820
FUTURE DEPENDS ON CHEMICAL KNOWLEDGE..... 1821
MOISTURE A PROBLEM IN FURNACE LININGS..... 1822
TIN AFFECTS BEHAVIOR OF STEEL..... 1823
PRODUCING STEEL FREE FROM DIRT 1826
APRIL STEEL IMPORTS SHOW DROP..... 1831
WAGE-FIXING BY STATE UNLAWFUL..... 1835
BUYING LIGHTER IN TOOL MARKET..... 1837
CONSTRUCTION AND ENTERPRISE 1839

The "Third Party" Is Restrained

WHILE the United States Supreme Court's opinion pertaining to the Kansas industrial court act goes only so far as to declare unconstitutional that part of the law giving the industrial court the right to fix wages, it is questionable whether the act now will fulfill the purpose conceived for it by its sponsors. The court holds that the state's attempt to fix wages was an encroachment on the constitutional rights of employes and employers. In one case it may result in involuntary servitude for employes, and in another force a company out of business "without due process of law." The court's ruling is neither a victory for labor nor capital; it is against the action of the third interest in business—the public, though in the broadest sense, it protects the public interest.

In other respects the opinion is significant. The act forbids workmen engaged in the production of food, clothing and fuel, and in transportation and public utilities, to conspire to strike. This restriction seemed reasonable to impose on labor so long as the court was in a position to decide what constituted fair wages and working conditions for the employes. Conversely, it appeared fair enough for the court to say to employers what they should pay when their employes were forbidden to strike.

Since the court is not in a position to dictate wages and working conditions, there may be some objection to compulsion under that provision aimed at combination for the purpose of strike. Public influence may be unfavorable to partial enforcement. The apparent strength of the act was that part which purported to give the court the right to decide what was fair between employes and employers.

The question is raised whether the industries enumerated are clothed with sufficient public interest to warrant the state dictating a labor policy. In the case decided by the Supreme Court this interest and the emergency complained of, which involved a strike in a packing house, were not considered sufficiently pressing to warrant such interference either with employes or employers. The situation was not at all comparable with that which arose when congress declared a national emergency existed and provided means for a settlement of difficulties involving railroad companies and their employes. Another important point in the opinion is that this public interest is not sufficient to give the state the power or authority to fix prices.

A satisfactory plan of arbitration may be worked out with a view to perpetuating a public agency with the wholehearted purpose of adjusting labor disputes, but lacking the ability to enforce its decisions, the Kansas industrial court is not the institution that it was supposed to be, for the automatic control of unruly forces in labor relations. As another step in the evolution of the age-old problem, the Supreme Court's opinion points ultimately to a system of settlement on a basis of mutual agreement and co-operation, as opposed to compulsion either by labor, capital or the third party of the trinity—the public.

Investigation Foreshadows Progress

BLAST furnace campaigns frequently are cut short by the intrusion of mechanical difficulties which necessitate prompt action on the part of the management. Disintegration of the furnace lining may occur from a few weeks to months after the stack is blown in and may cause the shell to spit or warp. During the last decade a number of blast furnace shells have failed and in many instances the cause of the failures has been attributed to poor quality brick. Recent investigation, however, has disclosed facts which refute this claim to a large extent.

Elsewhere in this issue is presented a plausible explanation of a shell failure at an eastern Pennsylvania stack. When the lining was torn out layers of amorphous carbon and disintegrated brick were found in the wearing plate section; a zone of sheared brick extended through the center of the stack wall lining from

the mantle to the wearing plates; and the brick contained globules of zinc and lead. The brick in this particular lining was of standard quality and, therefore, the raising of the top and the shearing of the furnace shell would have occurred with practically any brand of brick.

Conclusions of the author are that the furnace top was lifted by the growth of the brick column, the growth being caused chiefly by heavy deposits of carbon above and below the wearing plates; and, the shattered zone was caused by the top of the bosh jacket acting as a punch through the center of the brick mass as the lining was forced gradually downward.

During the war period many blast furnace operators accepted shipments of brick with high iron content, untrue in size and underburned and while linings made of these bricks may have caused shell failures in some instances, still it is highly plausible that other factors of a more disturbing character may have been present. To lay the cause of blast furnace shell failures at the door of refractory manufacturers, without thorough investigation, portrays a biased attitude and does not make for satisfactory technical advancement in the industry.

Sheet Capacity Meets Peak Loads

WERE there no periods of peak demand for steel sheets, about 30 per cent of the present mill capacity of this kind in the United States would be superfluous. Statistics of this branch of the steel industry reveal that the 659 mills have an annual capacity of 4,500,000 net tons. The minimum annual demand for sheets was 2,000,000 tons and the peak obsorption has reached 8,000,000 tons The average for a number of years has been 3,200,000 tons.

This average demand is sufficient to engage 72 per cent of mill capacity. If buying could be stabilized and spread out so that production might proceed continuously and without periods of idleness at one time and of high pressure and delayed deliveries at the other, present mill capacity might be cut down and all needs of the country be met.

Study of these figures may explain why sheet mills so frequently cut prices to obtain tonnage, while at other times are able to obtain lucrative premiums for service in the form of prompt delivery, special stock, etc.

The genius who devises some method whereby buying can be brought to an average rate each year instead of fluctuating so widely will be a benefactor to the producer as well as to the consumer. Under such ideal conditions, the average price would be lower than at present and the cost of production also would be reduced by the elimination of factors which now make it higher than it should be. For one thing labor turnover could be held in check to a large degree and production made more efficient. Probably such a state of the market smacks too much of the ideal to be possible, yet economic pressure may eventually force a solution of the problem.

Farmer Big Factor in Outlook

ONE of the most important and at present uncertain factors in the business outlook for the remainder of the year is the agricultural situation. The prevailing price of $1 a bushel, or less, to the producer of the winter wheat soon to come on the market, and the lowest price for hogs in 12 years, are not cheering facts. Admittedly the wheat and livestock farmers are not in a favorable economic position. However, it is not sound to pass judgment on the entire agricultural outlook on the basis of this consideration alone.

In order to get a complete view of the farmer's state it is necessary to study all agricultural producing groups. When this is done it is found that the cotton producer and the wool grower are well off and that the corn producer is fairly prosperous. In all classes of agriculture conditions are better than one year ago and the trend has been gradually upward. This is indicated by the fact that purchasing by farmers, measured by mail order, implement and automobile sales, have shown a substantial improvement over 1922.

Whether this demand will expand or wither in the coming months will depend largely upon the size of the crops now growing and the prices to be obtained for them. It is true that between 7 and 8 billion dollars worth of new wealth will be created from the soil this year. Unquestionably this will have the usual effect of increasing farmer demand and stimulating general business. Yet if the farmer does not receive enough for his produce to leave him a fair margin over production costs as well as enabling him to pay off some of his current debts, he will not find it possible to greatly expand his purchases.

Moreover, there is a wide disparity between the prices of things sold by the farmer and the cost of things he buys. Settlement of the Ruhr tangle and consequent re-establishment of the purchasing power in Germany would stimulate a demand for American food products which would react directly to the farmers' advantage. Last year the agricultural sections profited from large crops. This year, preliminary government estimates indicate, crops will not be so large as in 1922. For small grains, however, the output will be equal to the five-year average. The total indicated wheat crop is about 5 per cent under 1922 and 2 per cent below the five-year average. Taking all farm products, the government estimated yield is well up near the average and fairly satisfactory as to quantities.

Whether or not the prices will be equally satisfactory remains one of the most outstanding puzzles in the outlook.

Many Events Are Constructive

Success of Austrian Loan, the Higher Dividend Rates Declared by Important Railroad and Industrial Companies, and Large Freight Movements Denote More Confidence and Large Trade Activities—Motor Output at Record

BY JOHN W. HILL, FINANCIAL EDITOR

RECENT developments in finance and industry have been largely constructive. The Austrian loan has been greatly oversubscribed. A number of railroad and industrial companies have increased their dividends. May pig iron and steel ingot outputs were record breaking. Cotton consumption in May was the second largest total on record. Freight movements continue unprecedented for this time of the year. Copper demand is better and prices are firmer. In the iron and steel industry, the rate of buying has increased over one month ago.

Despite the constructive outlook for the immediate future, indecision has prevailed in many financial and commodity markets. Stocks are weak and nervous. This is partly due to failures of numerous alleged "bucketshops" on Wall Street. Hogs and wheat are selling at prewar prices. Cotton, sugar, wheat, zinc and rubber are easier. Crude oil has been cut again because of failure to curtail output.

Financial circles have been somewhat perturbed by evidences of overproduction and current curtailment in such lines as textiles, tires and automobiles. A part, at least, of the letdown in operations in these industries is seasonal. In the building industry there is a considerable suspension of activities but this is regarded as a healthy trimming of the abnormal program of construction. Building costs, as reflected by the Aberthaw index covering a modern concrete building, are 107 per cent over 1913. Increased wages caused an advance of four points in May.

During May the automobile industry as pictured in the Business Trend produced 405,000 cars, a new high record. This is at the annual rate of over 4,800,000 cars. Some curtailment has already begun and it probably will become more extensive in July and August. Some authorities estimate that the actual total production for the year will not exceed 3,000,000 cars. During the first five months the number produced was 1,680,000.

Faith in good earnings is shown by the higher dividends declared by the New York Central railroad and a number of industrial companies. These latter included some steel companies, where good profits now are being made, despite high costs. The success of the Austrian loan reflected the large reservoir of investment funds in this country.

May with an adverse trade balance of $51,000,000, marks the third successive month of imports excesses. This has been largely due to heavy crude material imports. Reduced output is resulting in some cancellations of import orders now. Exports have been falling, because of low European buying.

Index to Business Trend Charts

THIS ISSUE

Subject	Page
Iron and Steel Price Index	1809
Freight Car Situation	1810
Monthly Incorporations	1810
Wholesale Trade	1810
Aberthaw Index	1811
Bank Clearings	1811
Monthly Ingot Production	1811
Automobile Production	1812
Electric Power Production	1812
Steel Orders	1812

REFERENCES

Building Construction	June 14
Car Orders	June 14
Foundry Pig Iron Market	June 14
Iron and Steel Price Parity	June 14
Monthly Pig Iron Index	June 14
Railroad Earnings	June 14
Railroad Freight Traffic	June 14
State of Credit	June 14
Wage Factor	June 14
Coal Production	June 7
Copper Prices	June 7
Farmer Purchasing Power	June 7
Foreign Exchange	June 7
Independent Sheet Situation	June 7
Monthly Alien Migration	June 7
Security Prices	June 7
Cotton Consumption	May 31
Dollar Purchasing Power	May 31
Monthly Commodity Prices	May 31
Steel Castings Bookings	May 31
Structural Awards	May 31
Foreign Trade	May 24
Iron and Steel Foreign Trade	May 24
Monthly Coke Output	May 24
Prices and Failures	May 24
Business Index	May. 17
112 Years of Prices	May 3
Building Cost Index	April 26
Freight Factor	April 19
Wages and Living Cost	April 5
Steel Earnings	Feb. 8
Iron and Steel Production Rate	Feb. 1
Steel Output Per Capita	Feb. 1
Commodity Prices	Jan. 11
U. S. Crop Production	Dec. 28
Long Time Trend of Wages	Aug. 3

The Barometer of Business

WEEKLY COMPARISON

	Last week	Week before	One mo. ago	One year ago	Average 1913
Business failures	322	384	351	407	300
Cash ratio Fed. Res. System	77	75.7	75.3	77.4	...
Loan rate, 4-6 Mo. N. Y. (per cent)	5	5-5¼	5-5¼	4	5¼-6
Aver. 25 ind'l shares	$107.44	$109.71	$106.64	$96.69	$58.19
Aver. 25 rail shares	$62.19	$63.65	$60.38	$61.49	$82.95
Ave. 40 bonds	$77.60	$77.86	$75.56	$79.53	$93.00
Car loadings (week ended June 2)	932,041	1,014,029	961,029	750,645	*828,907
Bank debits 243 cities (000 omitted)	$8,879,074	$10,185,087	$10,191,772	$9,278,993	.....

*1920.

FOREIGN EXCHANGE (Demand)

	Normal	June 18 (close)	Week before	Mo. ago	Yr. ago
Sterling	$4.86	$4.62	$4.61	$4.62	$4.43
Francs	19.3c	6.19c	6.44c	6.58c	8.65c
Lira	19.3c	4.53c	4.65c	4.86c	4.91c
Marks	23.8c	0.0006c	0.0012c	0.0022c	0.30c

MONTHLY COMPARISON

	May	Month before	Year ago	Monthly average 1913
Dodge building awards in 27 states	$380,719,000	$358,693,000	$362,590,000	$71,450,000
Business failures:				
Number	1530	1520	1960	1336
Liabilities	$41,000,000	$46,991,941	$44,403,000	$22,723,000
Exports	$319,000,000	$325,449,000	$307,568,000	$207,000,000
Excess of gold imports	$44,531,887	$8,533,000	$5,587,299	†$630,716
Bureau of Labor Price Index	159	159	143	100
Bradstreet's Price Index	144.3	147.8	128.8	100
Economist's British Price Index	4412	4440	4372	2717
Cost of Living Index	159.1	159.2	154.8	100
New incorporations	$817,229,000	$1,006,258,000	$938,195,000	$172,301,000
Railroad net earnings	*$83,197,800	$83,568,000	$49,919,000	$59,900,000

*April. †Monthly average excess exports.

The Business Trend

June 21, 1923

TRADE TODAY, TOLD BY IRON TRADE REVIEW CHARTS

GENERAL SITUATION—Weakness continues in number of commodities, due partly to seasonal causes and partly to some excessive production and diminished demand; general trade continues active and enough underlying factors are sound to prevent any serious or major letdown.

AUTOMOBILES—May output of 405,000 passenger cars and trucks at new high record; five months production was 1,658,000 cars; some curtailment likly.

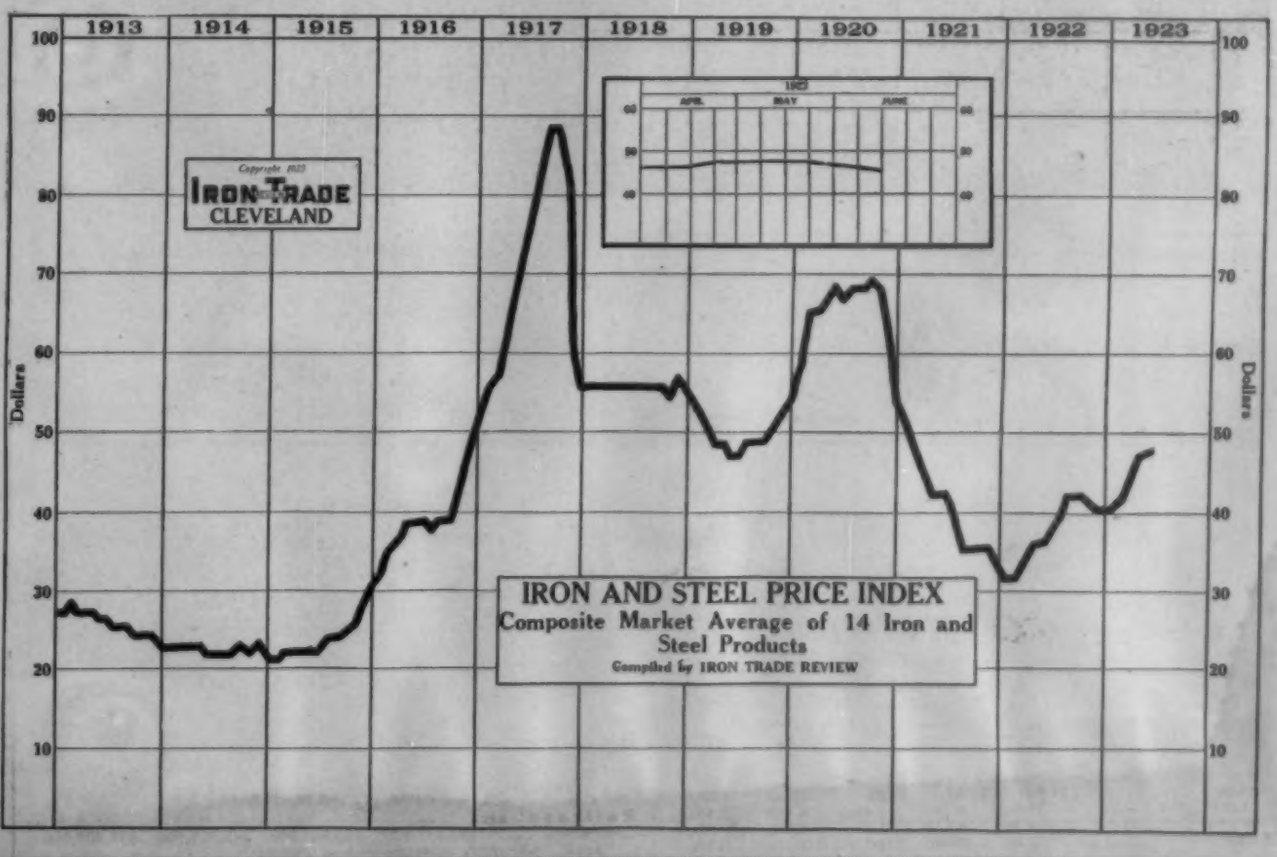
IRON AND STEEL PRICES—The composite market index of 14 iron and steel prices has declined 2.6 per cent from recent peak; 76 per cent over 1913, and 29 per cent above 1922.

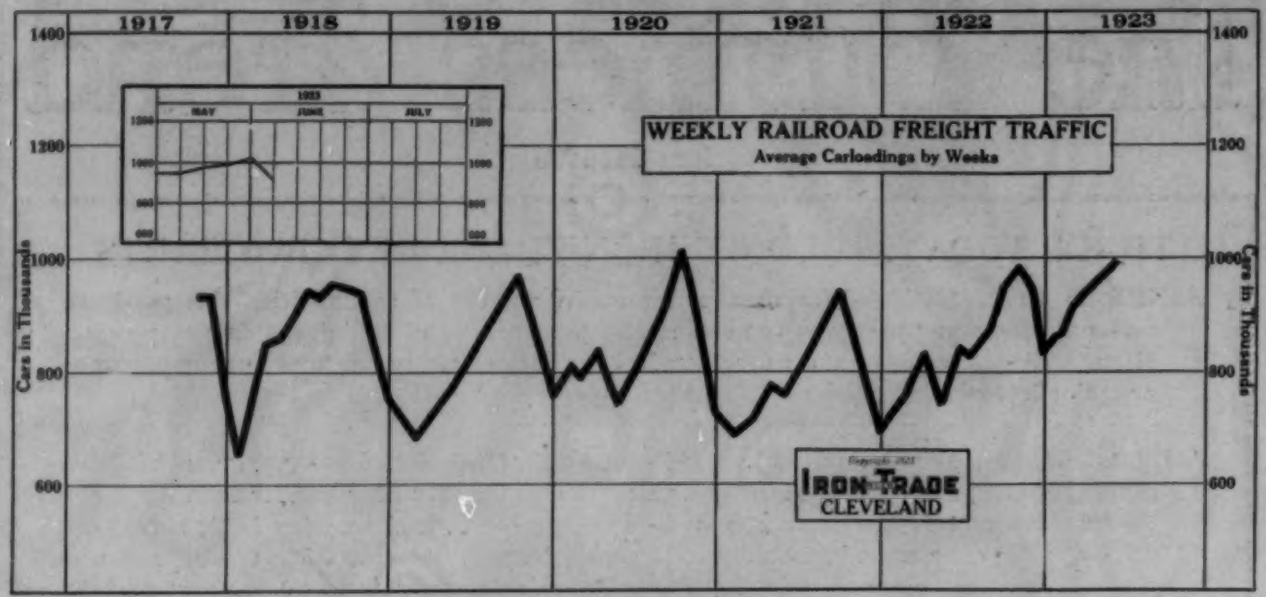
FREIGHT TRAFFIC—Drop in car loadings during week ended June 2 due to Decoration Day; daily average exceeded high record preceding week; May total loadings 30 per cent over 1922.

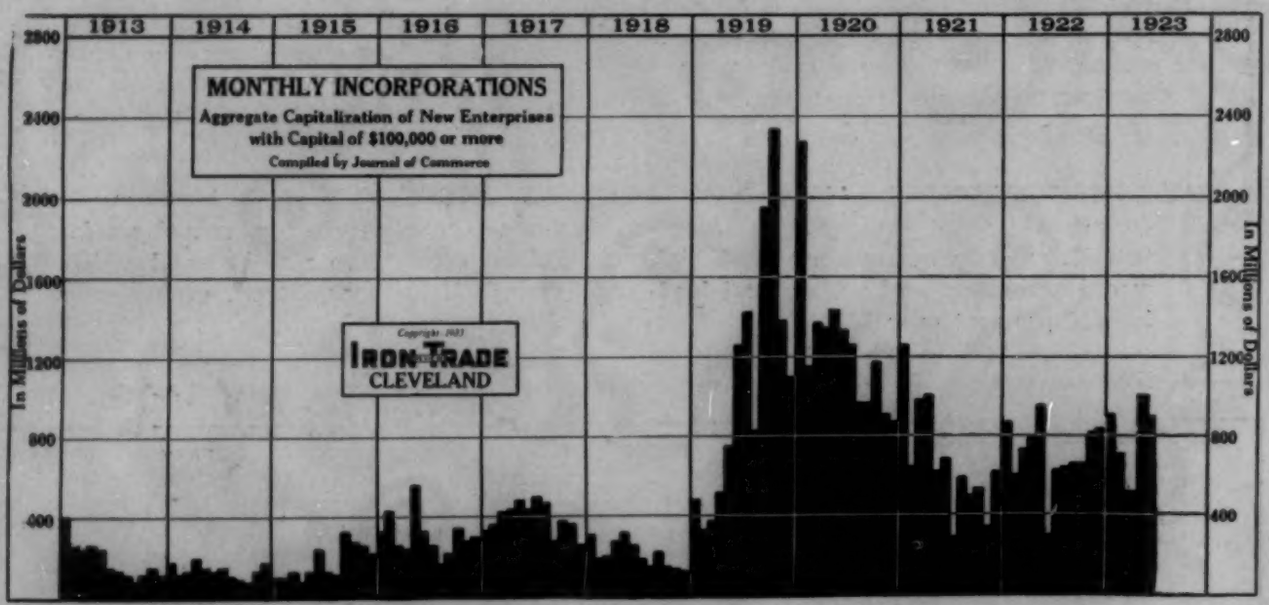
BANK CLEARINGS—Aggregate of bank clearings for May greater than April and 8.4 per cent above May 1922; New York clearings increase 0.02 per cent and outside clearings jump 20 per cent in year.

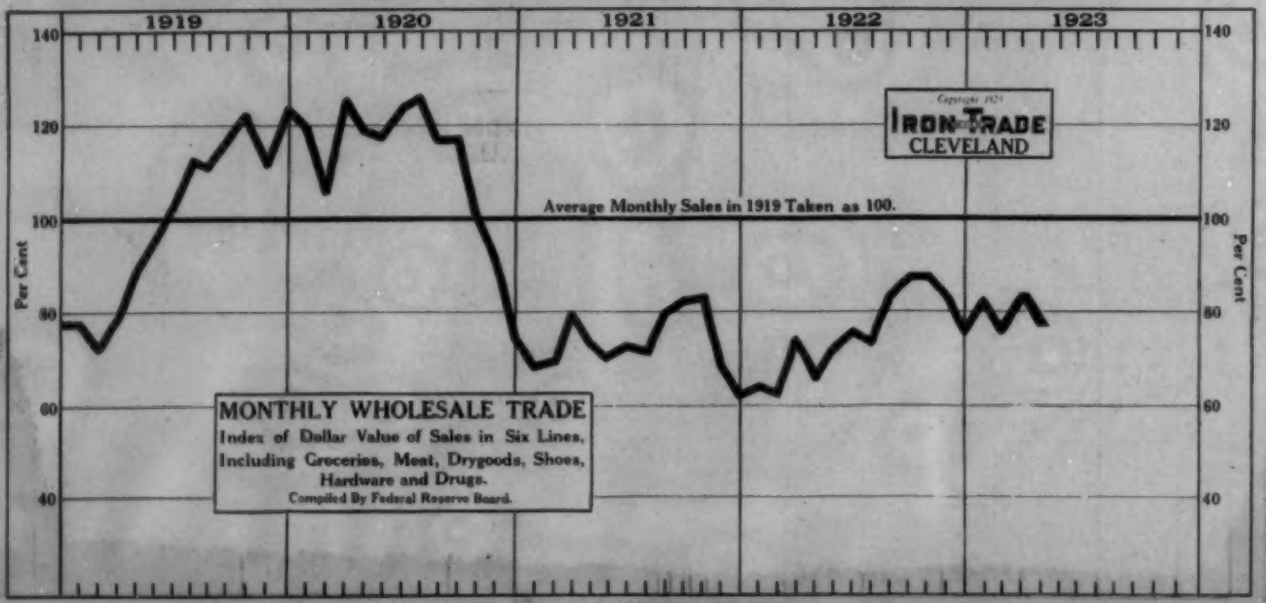
ABERTHAW INDEX—Increase in building wages caused gain in construction cost index for modern concrete building to 107 per cent over 1913 in May; index up 35 per cent in year.

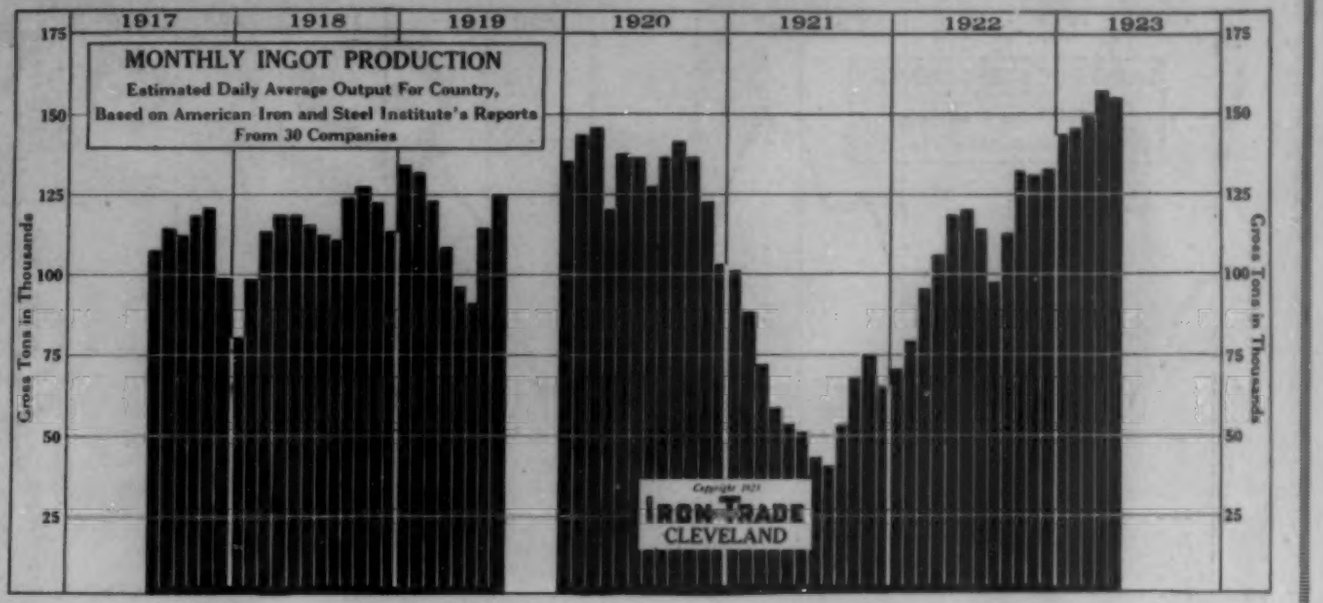
STEEL ORDERS—Unfilled bookings of United States Steel Corp. turn down for second consecutive month; total orders now 6,981,351 tons, 33 per cent greater than one year before.

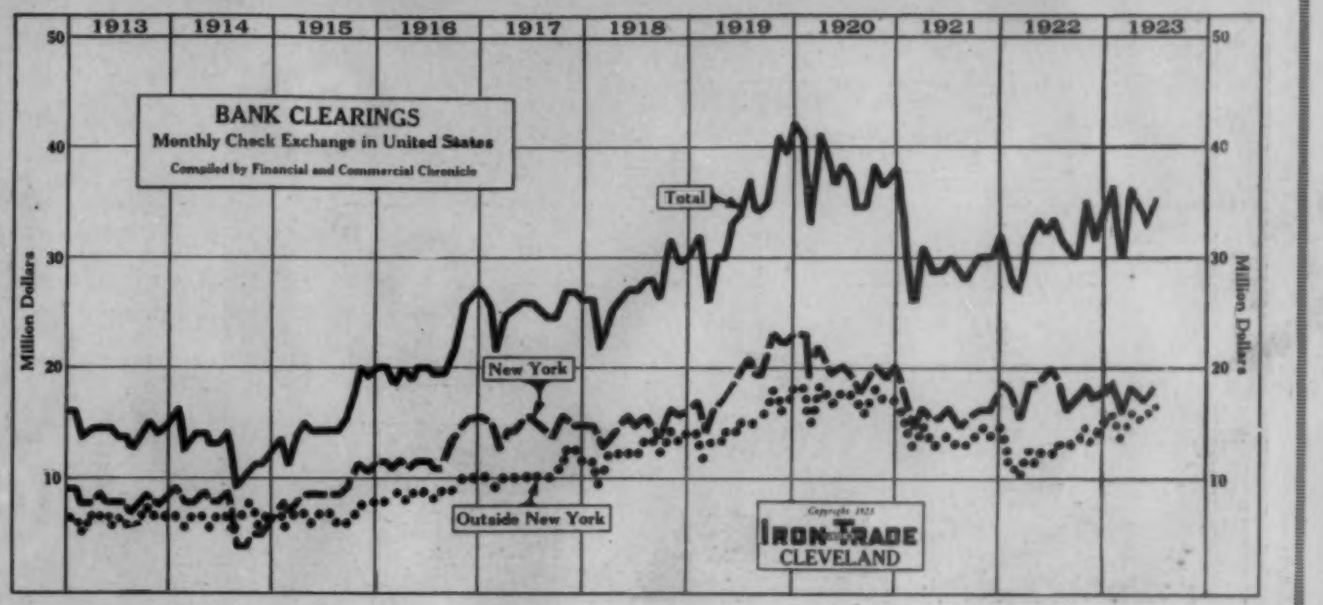


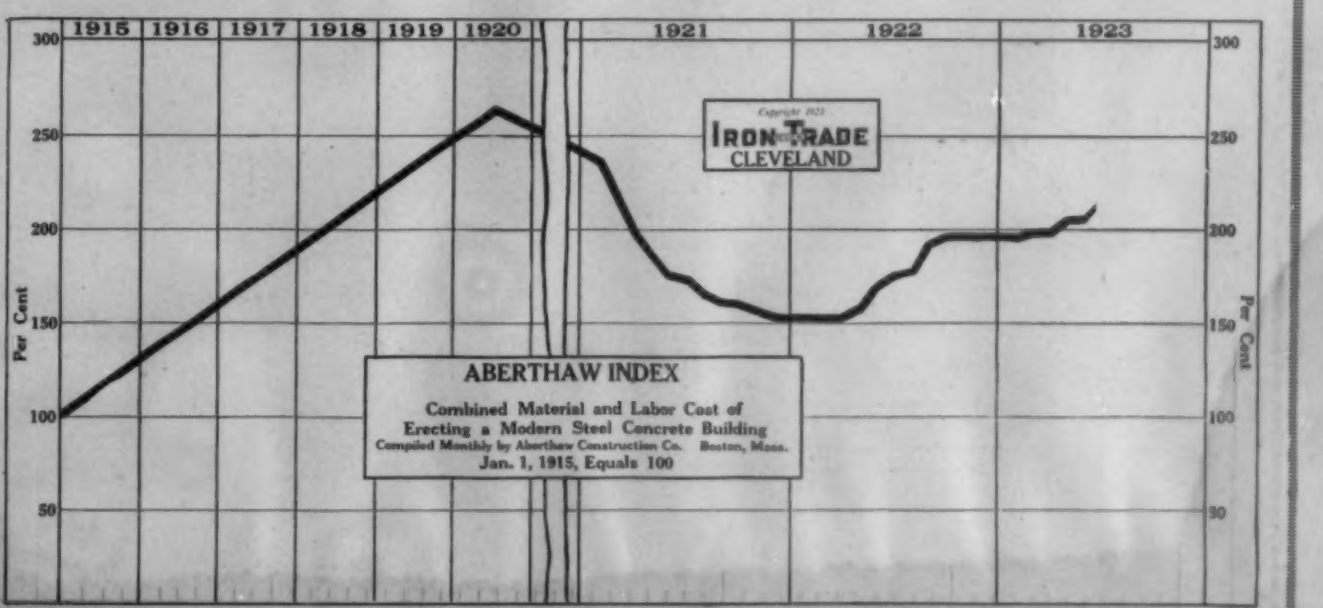

1917
1918
1919
1920
1921
1922
1923
1400
1200
1000
800
600
Cars in Thousands
1923
MAY
JUNE
JULY
WEEKLY RAILROAD FREIGHT TRAFFIC
Average Carloadings by Weeks
IRON TRADE
CLEVELAND

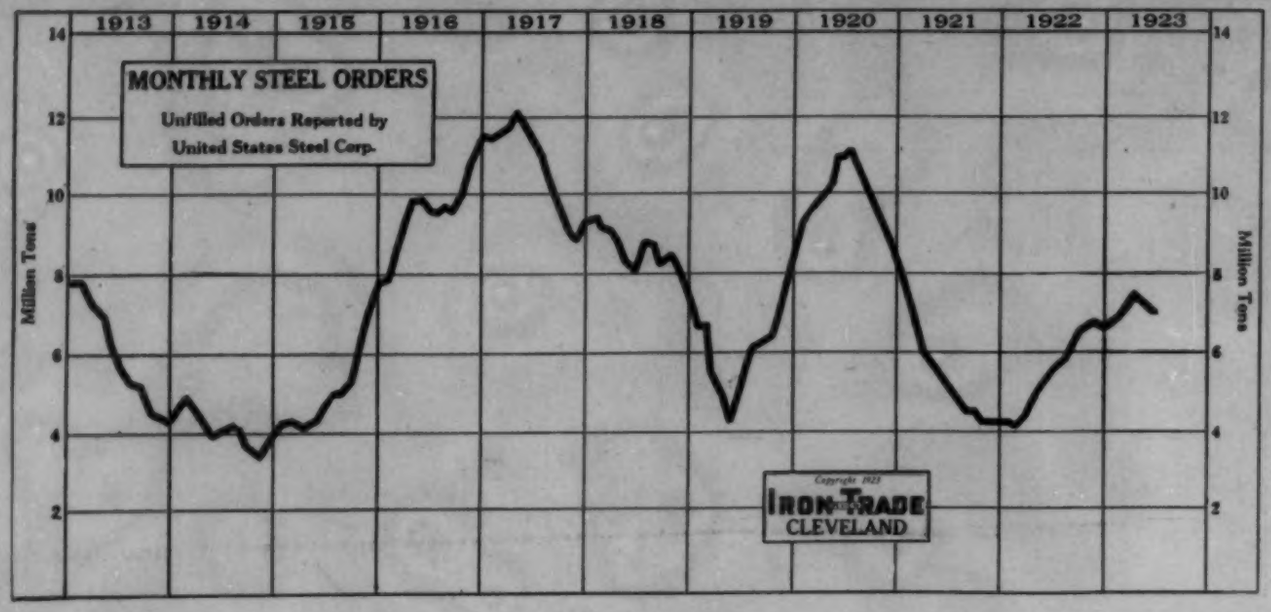

1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
2800
2400
2000
1600
1200
800
400
In Millions of Dollars
MONTHLY INCORPORATIONS
Aggregate Capitalization of New Enterprises with Capital of $100,000 or more
Compiled by Journal of Commerce
IRON TRADE
CLEVELAND

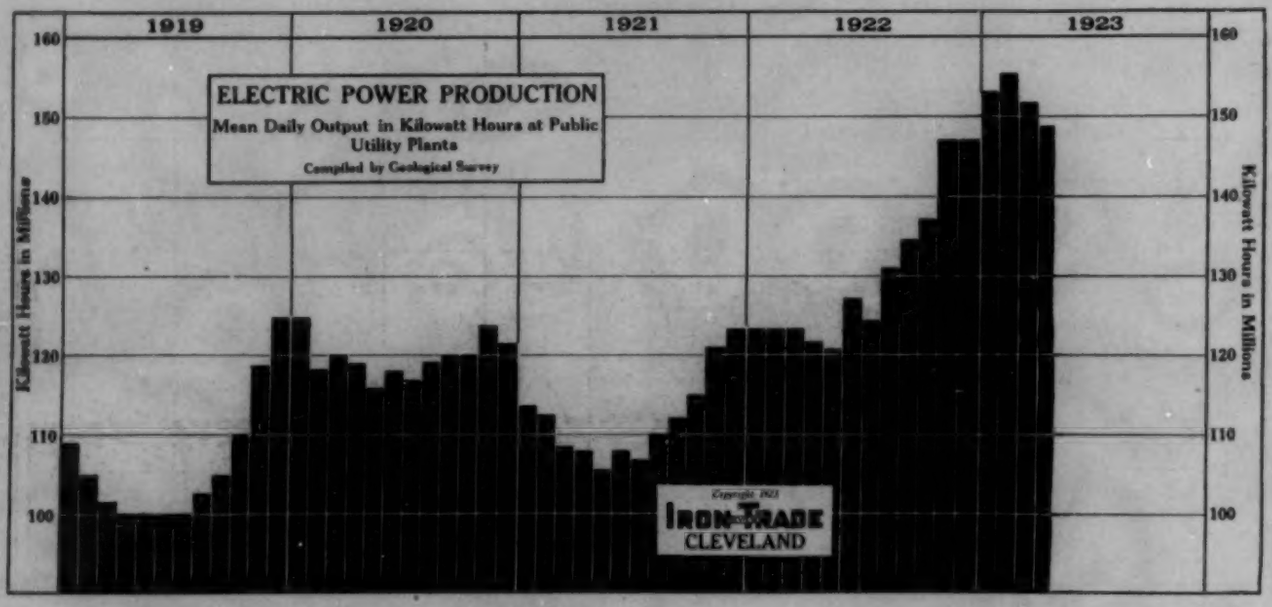

1919
1920
1921
1922
1923
140
120
100
80
60
40
Per Cent
Average Monthly Sales in 1919 Taken as 100.
IRON TRADE
CLEVELAND
MONTHLY WHOLESALE TRADE
Index of Dollar Value of Sales in Six Lines, Including Groceries, Meat, Drygoods, Shoes, Hardware and Drugs.
Compiled By Federal Reserve Board.

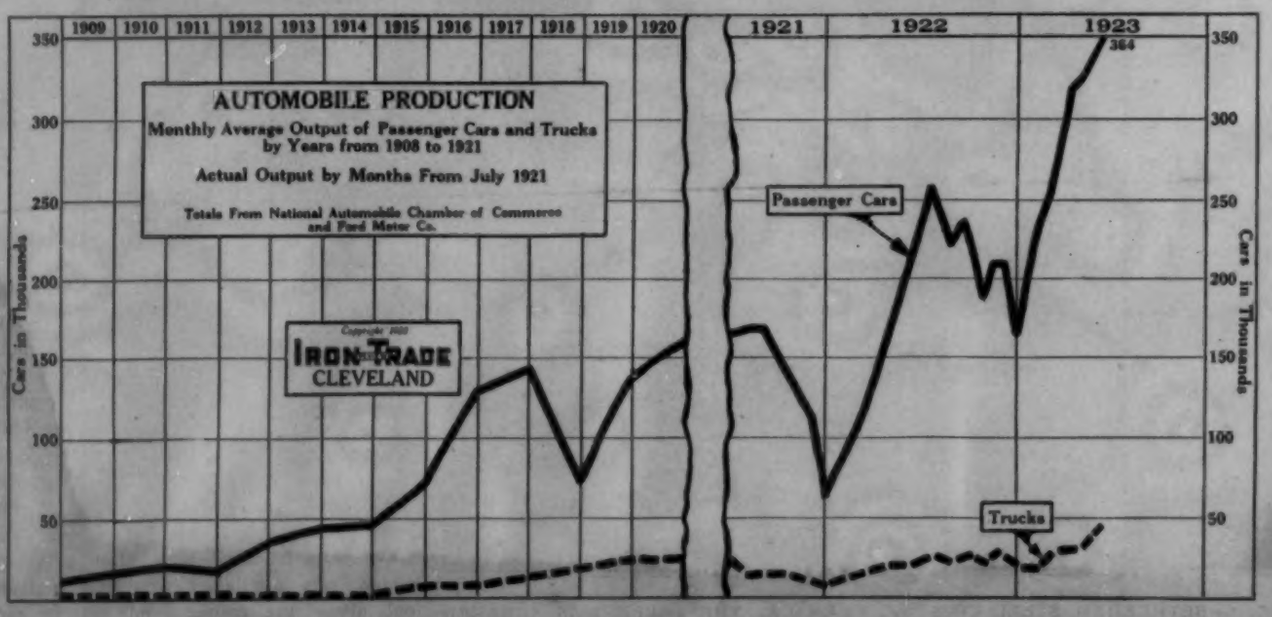

1917
1918
1919
1920
1921
1922
1923
MONTHLY INGOT PRODUCTION
Estimated Daily Average Output For Country,
Based on American Iron and Steel Institute's Reports
From 30 Companies
Gross Tons in Thousands
175
150
125
100
75
50
25
Copyright 1923
IRON TRADE
CLEVELAND


1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
BANK CLEARINGS
Monthly Check Exchange in United States
Compiled by Financial and Commercial Chronicle
Total
New York
Outside New York
Million Dollars
50
40
30
20
10
Copyright 1923
IRON TRADE
CLEVELAND


1915
1916
1917
1918
1919
1920
1921
1922
1923
Copyright 1923
IRON TRADE
CLEVELAND
ABERTHAW INDEX
Combined Material and Labor Cost of
Erecting a Modern Steel Concrete Building
Compiled Monthly by Aberthaw Construction Co. Boston, Mass.
Jan. 1, 1915, Equals 100
Per Cent
300
250
200
150
100
50


MONTHLY STEEL ORDERS
Unfilled Orders Reported by United States Steel Corp.
1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
Million Tons
IRON TRADE
CLEVELAND


ELECTRIC POWER PRODUCTION
Mean Daily Output in Kilowatt Hours at Public Utility Plants
Compiled by Geological Survey
1919 1920 1921 1922 1923
Kilowatt Hours in Millions
IRON TRADE
CLEVELAND


AUTOMOBILE PRODUCTION
Monthly Average Output of Passenger Cars and Trucks by Years from 1908 to 1921
Actual Output by Months From July 1921
Totals From National Automobile Chamber of Commerce and Ford Motor Co.
1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923
384
Passenger Cars
Trucks
Cars in Thousands
IRON TRADE
CLEVELAND

Brick Column Lifts Furnace Top

Shell Rivets on an Eastern Pennsylvania Stack Are Sheared and the Entire Top Rigging Elevated by Excessive Pressure Caused by Amorphous Accumulation Between Wearing Plates — Investigation Discloses Important Data

BY G. M. HOHL

FAILURE of blast furnace shells during the past few years, necessitating the blowing out of the stack for repairs, has not been uncommon. At the "G" furnace of the Bethlehem Steel Co., Bethlehem, Pa. the rivets between the second and third row of plates from the top of the stack were sheared off Feb. 17, 1921 and two weeks later those along the entire horizontal seam failed also. During the following eight months the top of the stack raised 8 inches and orders were issued to blow out Oct. 18, 1921.

Disintegrated brick and plates of amorphous carbon were found in the wearing plate zone; a zone of sheared brick extended through the center of the stack wall from the mantel to the wearing plates; and zinc and lead globules were found in the brick. The stack was built during 1910-1911 and began its fourth campaign Oct. 29, 1919. The shell throughout was made of 1-inch plates, triple butt riveted vertically and double lapp riveted horizontally. Twenty-seven rows of cast-steel wearing plates were laid in brick and concrete at the top extending 17½ feet downward as shown in Figs. 3 and 15. A revolving distributor of the Baker-Newman type was used during the first year of the fourth campaign and an imitation narrow throat hopper during the second year.

The author is superintendent of blast furnaces, Bethlehem Steel Co., Bethlehem, Pa.

Rivets Are Sheared

During the afternoon of Feb. 17, 1921 the top of the stack made a slight upward movement, shearing about 10 rivets between the second and third sheets below the cone sheet. The point at which the first break occurred is shown in Fig. 1. Patch plates were fastened with tap bolts above and below the break but the bolts soon failed and in less than three weeks the entire horizontal seam had become sheared. Patches were placed completely around the circumference but they did not hold. After the top had raised 3 inches the movement seemed to stop and no further effort was made to hold the plates together. Slots, however, were cut in the skip incline to permit the top room to rise.

From about April 1 to Oct. 15 there were periods of weeks during which the top remained stationary. In July the plates no longer overlapped. By October there was a 3-inch opening between the plates on the southwest side. As the structural material of the top was becoming torn and twisted, it was decided to blow the furnace out, which was done Oct. 18, 1921.

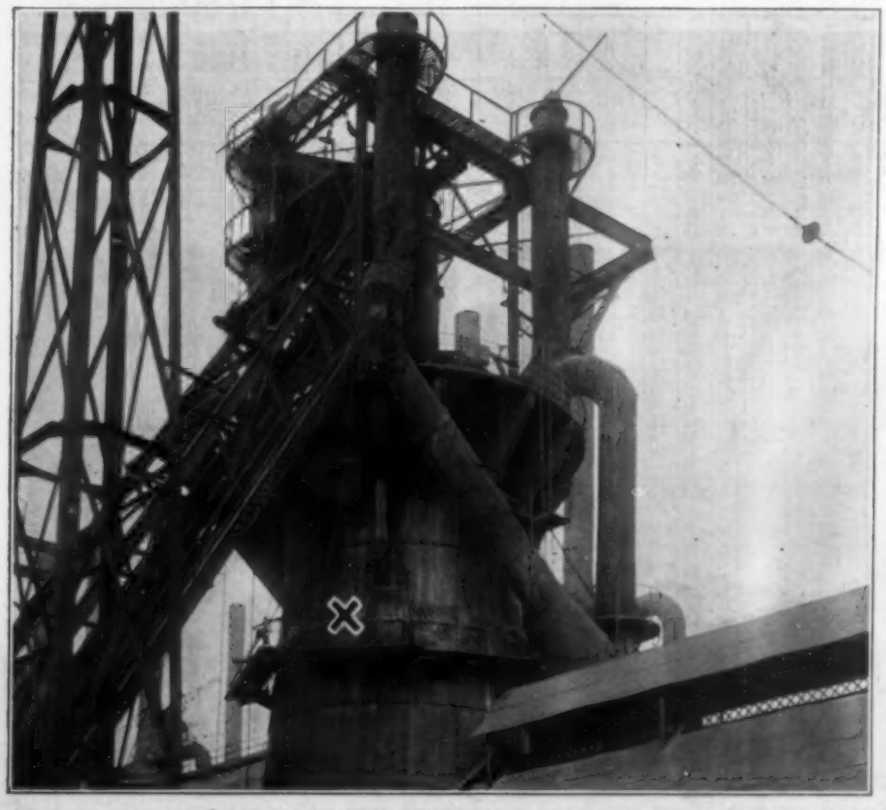


FIG. 1—BETHLEHEM STEEL CO.'S "G" FURNACE. THE SHELL WAS SHEARED IMMEDIATELY ABOVE THE TEMPORARY PLATFORM

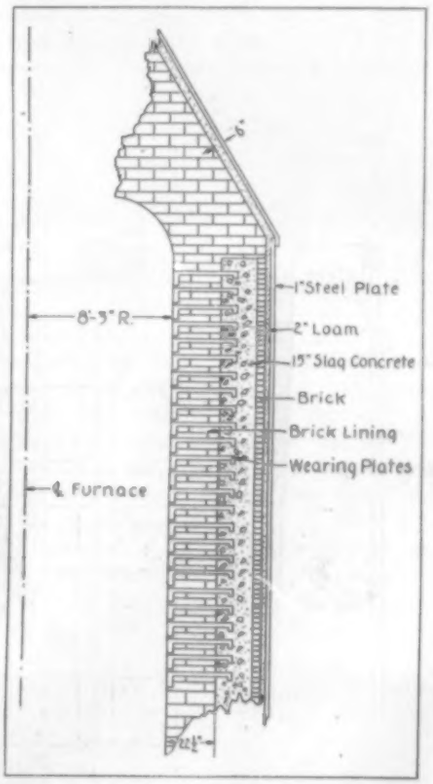


FIG. 2—LINES OF "G" FURNACE AFTER BLOWING OUT

With the top of the furnace in such condition it was expected that some bad effects would be experienced in the furnace operation. However, the furnace had several bad spells at times but no more than usual. The stack had always worked on a high blast pressure which was attributed to being gouged out above the mantel, and not to the top. The tonnage, coke practice, average

pressure and top temperature for "G" are shown in the accompanying table. The top temperature for February, 1921, was the highest recorded during the blast. In a previous blast "G" furnace ran for 11 months with a top temperature ranging from 520 to 675 degrees Fahr.

Investigation Is Started

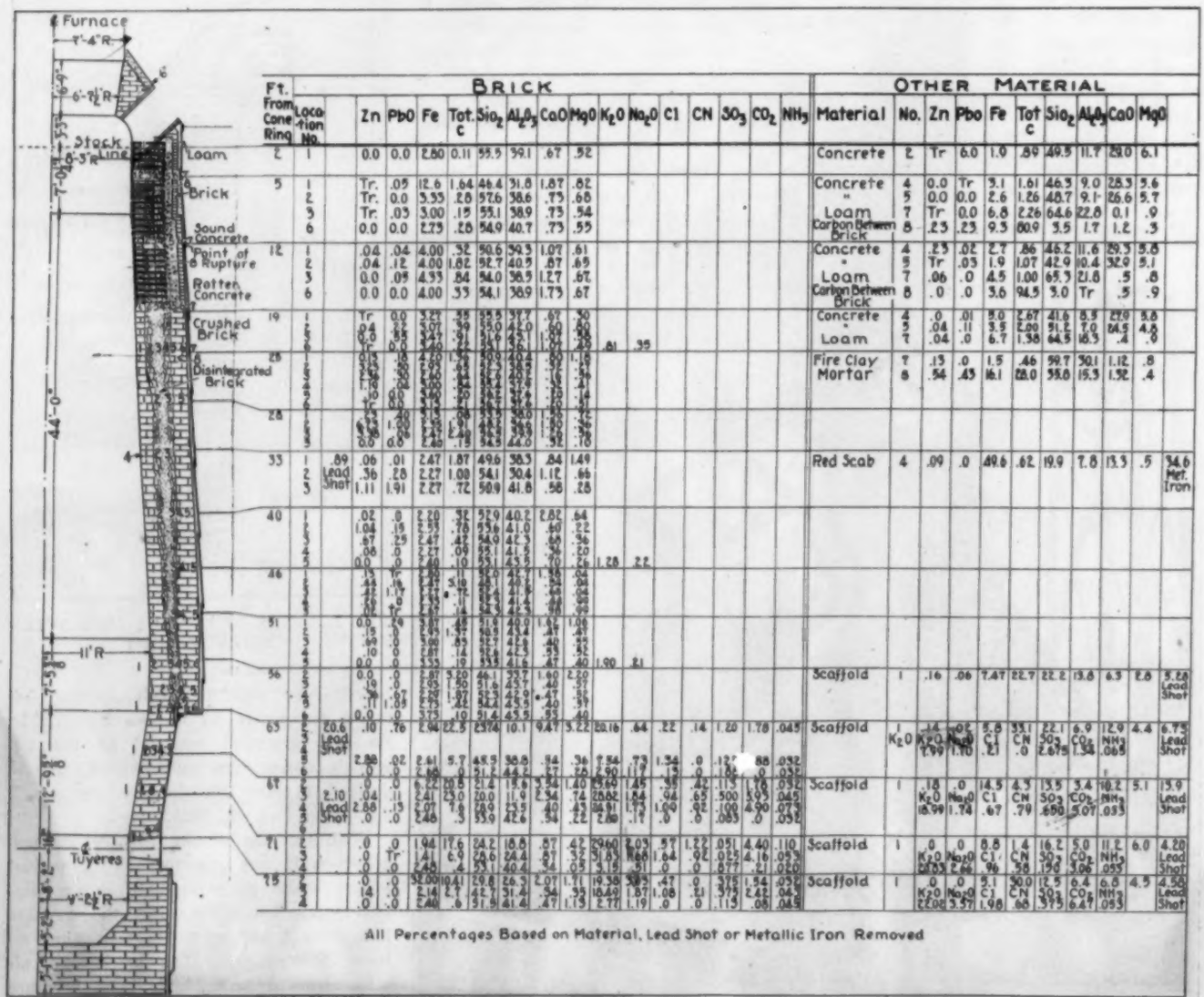
Since enough force was developed within the furnace to shear the 1¼-inch rivets all the way round, it was apparent that the real source of trouble was not light construction. P. O. Menke, superintendent the Shenango Furnace Co., Sharpsville, Pa., who visited the Bethlehem plant during March, 1921, suggested that the furnace lining be tested for zinc. The shells of two stacks at Sharpsville, Pa., had cracked and most of the difficulty was traced to this element. An investigation showed the presence of zinc in the brickwork from 0 to 4.31 per cent. The largest concentration of zinc was from 3 inches from the inside to 18 inches back. From this point to the shell, little zinc was encountered. Carbon was found in quantities up to 1.80 per cent by weight and was more widely disseminated throughout the lining than the zinc, but the concentration was larger in the zones which contained the most zinc.

The proven presence of both carbon and zinc in the lining led to the belief that these elements had caused the brick to swell, thus causing the shell rupture. The suppositions are that zinc and carbon could be deposited mechanically throughout the brick, causing an increase in volume; second, there could be a chemical combination of zinc oxide with the excess silica of the brick forming willemite Zn_2SiO4 ($2ZnO\ SiO_2$); or third, a zinc aluminate could be formed, $ZnAl_2O_4$ ($ZnO\ Al_2O_3$). It is also possible that a zinc alumino silicate could be formed. Whether any of these combinations took place, and if so, the resultant effect on the brickwork was unknown while the furnace was in blast.

Analysis of all the ores used showed the following results:

Source	Zinc per cent
Forrest of Dean ore	0.0
Eureka ore	0.0
Lebanon sinter	Tr.
Port Henry crude ore	0.0
Harmony concentrates	Tr.
Daiquiri ore	0.0
Heating furnace cinder	Tr.
Central western ore	Tr.
Beaver ore	0.0
Ontario ore	Tr.
Plymouth ore	0.0
Manganese residuum	2.09

The manganese residuum was used for the first time in "G" furnace Feb. 4, 1920, the shell cracking 13 days later. This was almost too soon to have any direct bearing on the break. Zinc, however, is cumulative in a furnace. A few hundredths of one per cent in an ore will cause an accumulation. It condenses at 1550 degrees Fahr. and thus forms a cycle between the upper and lower parts of the stack. It is volatilized in the two zones, condensed in the top, carried down and revolatilized.



Ft. From Cone Ring	Location No.		Zn	Pb0	Fe	Tot. C	SiO_2	Al_2O_3	CaO	MgO	K_2O	Na_2O	Cl	CN	SO_3	CO_2	NH_3
	1		0.0	0.0	2.80	0.11	55.9	39.1	.67	.52							
5	1		Tr.	.05	12.6	1.64	46.4	31.8	1.87	.82							
	2		Tr.	0.0	3.55	.28	57.6	38.6	.75	.68							
	3		Tr.	.03	3.00	.15	55.1	38.9	.73	.54							
	6		0.0	0.0	2.23	.28	54.9	40.7	.73	.55							
12	1		.04	.04	4.00	.32	50.6	34.3	1.07	.61							
	2		.04	.12	4.00	1.82	52.7	40.9	.87	.69							
	3		0.0	.09	4.33	.84	54.0	36.9	1.27	.67							
	6		0.0	0.0	4.00	.33	54.1	38.9	1.73	.67							
19	1		Tr	0.0	3.21	.55	55.5	39.7	.67	.50							
	2		.04	.32	5.07	.59	55.0	42.0	.60	.60							
	5		0.0	.55	3.42	.91	51.9	42.1	1.07	.58							
	6		Tr	0.0	2.40	.22	54.1	41.6	.73	.55	.61	.35					
26	1		0.15	.18	4.20	1.54	50.8	40.4	.93	1.18							
	2		2.45	.30	2.05	.65	52.3	38.9	.92	.74							
	5		1.58	.30	2.60	.64	56.0	40.0	.76	.56							
	6		.10	0.0	3.40	.20	56.2	37.9	.75	.54							
			Tr	0.0	3.15	.21	56.7	37.6	.70	.57							
28	1		.53	.20	3.15	.68	53.3	38.0	1.05	.72							
	2		0.38	1.00	2.45	2.40	49.6	38.3	1.00	.56							
	5		0.38	0.0	2.40	.78	54.5	44.0	.92	.70							
33	1	.89 Lead Shot	.06	.01	2.47	1.87	49.6	38.3	.84	1.49							
	2		.36	.28	2.27	1.08	54.1	30.4	1.12	.66							
	3		1.11	1.91	2.27	.72	50.9	41.8	.56	.28							
40	1		.02	.0	2.20	.32	52.9	40.2	2.82	.64							
	2		1.04	.15	2.55	.76	55.6	41.0	.60	.22							
	3		.67	.29	2.47	.42	54.9	42.3	.66	.56							
	4		.06	.0	2.27	.09	55.1	41.6	.70	.20							
	5		0.0	.0	2.40	.10	54.2	43.5	.92	.26	1.28	.22					
46	1		.15	Tr	2.80	.10	52.0	42.7	1.38	.64							
	2		.44	.16	2.29	3.10	48.1	40.2	.52	.84							
	3		.42	1.17	2.53	.72	55.6	41.8	.69	.64							
	4		.12	.0	2.53	.14	54.3	41.4	.68	.68							
	5		.02	Tr	2.29	.14	52.3	42.5	.68	.99							
51	1		0.0	.29	3.07	.48	51.9	40.0	1.62	1.06							
	2		.15	.0	2.85	1.37	50.9	43.4	.87	.49							
	3		.90	.0	3.00	.85	52.7	42.8	.60	.56							
	4		.10	.0	3.00	.14	52.6	42.8	.93	.42							
	5		0.0	.0	3.53	.10	53.3	41.6	.67	.40	1.90	.21					
56	2		0.0	.0	2.87	3.20	46.1	33.7	1.60	2.20							
	5		.19	.0	2.95	1.50	51.6	45.7	.60	.59							
	6		.78	.07	2.99	1.07	52.3	42.9	.47	.56							
			.11	1.09	2.75	.24	52.3	43.5	.60	.59							
	9		0.0	.0	3.73	.10	51.4	45.5	.93	.60							
65	2	20.6 Lead Shot	.10	.76	2.94	22.5	23.74	10.1	9.47	5.22	20.16	.64	.22	.14	1.20	1.78	.045
	3		2.88	.02	2.61	5.7	48.5	36.6	.54	.36	7.54	.73	1.34	.0	.127	.88	.032
	4		.0	.0	2.60	.0	51.2	44.2	.67	.26	2.90	1.17	.13	.0	.106	.0	.032
	5		.0	.0	2.80	.0	51.2	44.2	.67	.26	2.90	1.17	.13	.0	.106	.0	.032
67	2		.0	.0	6.22	20.5	21.4	19.6	3.54	1.40	13.60	1.45	.38	.42	.115	1.16	.032
	3	2.10 Lead Shot	.04	.11	2.41	23.0	20.0	11.9	2.54	.72	25.62	1.84	.94	.65	.500	5.93	.045
	4		2.86	.13	2.07	1.8	48.9	23.5	.40	.43	34.91	1.73	1.00	.92	.100	4.90	.075
	5		.0	.0	2.46	.3	53.9	42.6	.54	.22	2.80	.11	.0	.0	.085	.0	.032
71	2		.0	.0	1.94	17.6	24.2	18.8	.57	.42	29.60	2.03	.57	1.22	.051	4.40	.110
	3		.0	Tr	2.41	6.9	28.6	24.4	.87	.32	31.83	1.86	1.64	.92	.025	4.16	.095
	4		.0	.0	2.45	.4	53.1	40.4	.74	.05	3.15	.91	.0	.0	.077	.21	.020
75	2		.0	.0	52.00	10.41	29.8	26.3	2.07	1.71	19.58	3.95	.47	.0	.575	1.84	.032
	3		.14	.0	2.14	2.7	42.7	31.4	.56	.35	10.49	1.87	1.08	.21	.375	2.42	.045
	4		.0	.0	2.40	.6	51.9	41.4	.47	1.15	2.77	1.19	.0	.0	.115	.08	.045

Material	No.	Zn	Pb0	Fe	Tot C	SiO_2	Al_2O_3	CaO	MgO	
Concrete	2	Tr	6.0	1.9	.89	49.5	11.7	29.0	6.1	
Concrete	4	0.0	Tr	3.1	1.61	46.3	9.0	28.3	5.6	
"	5	0.0	0.0	2.6	1.26	48.7	9.1	26.6	5.7	
Loam	7	Tr	0.0	6.8	2.26	64.6	22.8	0.1	.9	
Carbon Between Brick	8	.23	.23	9.3	80.9	3.5	1.7	1.2	.3	
Concrete	4	.23	.02	2.7	.86	46.2	11.6	29.3	5.8	
"	5	Tr	.03	1.9	1.07	42.9	10.4	32.9	5.1	
Loam	7	.06	.0	4.5	1.00	65.3	21.8	.5	.8	
Carbon Between Brick	8	.0	.0	3.6	94.5	3.0	Tr	.5	.9	
Concrete	4	.0	.01	5.0	2.67	41.6	8.5	27.0	5.6	
"	5	.04	.11	3.5	2.00	51.2	7.0	24.5	4.8	
Loam	7	.04	.0	6.7	1.38	64.5	16.3	.4	.9	
Fire Clay	7	.13	.0	1.5	.46	59.7	30.1	1.12	.8	
Mortar	8	.54	.43	16.1	22.0	38.8	19.5	1.52	.4	
Red Scab	4	.09	.0	49.6	.62	19.9	7.8	13.3	.5	34.6 Met. Iron
Scaffold	1	.16	.06	7.47	22.7	22.2	13.8	6.3	2.8	5.28 Lead Shot
Scaffold	1	.16	.02	5.8	33.1	22.1	6.9	12.9	4.4	6.75 Lead Shot
		K_2O 1.99	Na_2O 1.10	Cl .21	CN .0	SO_3 2.675	CO_2 1.34	NH_3 .085		
Scaffold	1	.18	.0	14.5	4.3	13.5	3.4	10.2	5.1	15.9 Lead Shot
		K_2O 16.99	Na_2O 1.74	Cl .67	CN .79	SO_3 .650	CO_2 5.07	NH_3 .033		
Scaffold	1	.0	.0	8.8	1.4	16.2	5.0	11.2	6.0	4.28 Lead Shot
		K_2O 2.03	Na_2O 2.66	Cl .96	CN .58	SO_3 1.90	CO_2 3.06	NH_3 .055		
Scaffold	1	.0	.0	5.1	50.0	12.5	6.4	6.5	4.5	4.50 Lead Shot
		K_2O 2.08	Na_2O 3.57	Cl 1.98	CN .66	SO_3 .375	CO_2 6.41	NH_3 .093		

All Percentages Based on Material, Lead Shot or Metallic Iron Removed

FIG. 3—VERTICAL SECTION OF "G" FURNACE SHOWING THE ZONE OF SHATTERED BRICK IN THE CENTER OF THE LINING WHICH EXTENDED FROM THE WEARING PLATES TO THE MANTLE. ANALYSES OF THE BRICKWORK AT VARIOUS POINTS ALSO ARE SHOWN

Practice on "G" Furnace for Two-Year Campaign

	Average daily output gross tons	Coke practice	Average blast pressure, pounds per square inch	Average top temperature, degrees Fahr.
November, 1919	427.2	0.895	19.20	347
December, 1919	481.8	0.901	20.78	433
January, 1920	521.4	0.886	22.11	412
February, 1920	524.5	0.898	19.64	465
March, 1920	568.2	0.847	21.21	456
April, 1920	493.6	0.776	20.50	388
May, 1920	488.9	0.869	22.00	451
June, 1920	467.1	0.895	22.50	396
July, 1920	467.5	0.833	24.00	359
August, 1920	504.4	0.828	20.70	385
September, 1920	464.7	0.877	22.40	350
October, 1920	525.6	0.789	22.80	383
November, 1920	493.3	0.838	21.80	441
December, 1920	439.8	0.784	21.60	423
January, 1921	490.8	0.691	21.00	481
February, 1921	427.0	0.861	19.30	581
March, 1921	434.4	0.910	20.40	407
April, 1921	442.5	0.866	21.80	326
May, 1921	488.8	0.902	21.00	370
June, 1921	435.4	0.912	20.50	421
July, 1921	386.4	0.867	20.30	365
August, 1921	493.0	0.871	18.90	372
September, 1921	466.7	0.863	19.00	283
October, 1921	438.7	....	19.50	309

Eventually it works into the brickwork, or is carried out with the gas, during periods of high temperatures of the top gases.

Early Theories Are Discussed

When the furnace was blown out it was still a matter of conjecture as to the real cause of the trouble. The presence of zinc and carbon in the brickwork was known and the steam-pressed bricks were suspected of expanding more than they should, but little data was at hand to bear this out. The fact remained, however, that some force inside the brickwork had lifted the furnace top from 6½ to 8½ inches, and that this force was sufficient to shear all rivets of one seam and to lift the downcomers from their supports and the skip from its foundation. It was apparently a straight vertical force, because the vertical seams remained intact. The engineering department estimated that if all the rivets were sheared at once, 8000 tons was the force required plus 1500 tons more for the weight of the structure above the break.

When the furnace was blown out, the structural work of the furnace top was bent and twisted. The downtakes from the bleeders had been pushed up, making a decided bend at the joint. The girder supporting the skip incline had its rivets at both ends sheared off and its center bent downward as shown in Fig. 5. The braces of the top also had been sheared off. The rivets between two sections of the offtakes from the two North bleeders had been sheared around the entire circumference.

The first inspection of the lining after the furnace was blown out showed the lines of the furnace to be fairly good as shown in Fig. 2. The bricks were worn uniformly and there were apparently no holes gouged out. The wearing plates were all in position, but the bottom 21 rows were badly warped. The face of each plate was bent out into the flow of gas.

All analyses are shown in Fig. 3. The bricks at the extreme top were in excellent condition. The loam backing at this point was all in place. All brickwork and concrete around the first six rows of wearing plates from the top was practically as good as the day it was put in. From a point 6 feet below the top the brickwork began to show disintegration which became extremely noticeable directly inside the break or about 16 feet below the top. At this point all the bricks were so soft that it was

FIG. 6—DISINTEGRATION OF BRICK AND CONCRETE IN THE WEARING PLATE ZONE

FIG. 4—DISINTEGRATION OF THE BRICKWORK BEGAN DIRECTLY BENEATH THE OFFTAKE CASTINGS. FIG. 5—THE GIRDER, INDICATED BY X, WHICH SUPPORTS THE SKIP INCLINE, HAD ITS RIVETS AT BOTH ENDS SHEARED AND WAS BENT DOWNWARD

impossible to remove one without crumbling. The bricks appeared as though the bonding material had been eaten away and at the first touch would fall into a pile of flint clay. They were discolored a dark gray. The concrete behind the wearing plates could be pulled apart with the fingers. The starting of this disintegration as shown in Fig. 4 took place directly underneath the offtake castings. The bricks, in front of which the wearing plates were laid, were in powder form and evidences of carbon specks were found throughout. Fig. 6 is another view of this disintegration of brick and concrete.

FIG. 7—A ZONE OF SHATTERED BRICK WAS FOUND IN THE CENTER OF THE STACK LINING

Just inside the break the wearing plates were bent out sharply and the brickwork fell apart when touched. The single course of brick next to the shell was in good condition throughout the entire stack. One peculiar feature of the wearing plate construction was that above every plate there was a thin layer, never more than ¼-inch thick, of black amorphous material, while below the plates there were accumulations of this material sometimes 1¼ inches thick. Analysis showed that this consisted of over 80 per cent carbon. These deposits can be seen underneath the wearing plates in Fig. 13. The manner in which the brickwork was fractured, apparently by hundreds of particle seams, is shown strikingly in this view. It was taken of the cross section of the wearing plate zone just inside where the break occurred.

Fig. 11 shows the face of the lower sections of the wearing plates and the manner in which they were warped outward. When the support of the wearing plates beneath the offtake elbows was removed, the top of the furnace slid back into place. In less than a week the upper and lower part of the shells were riveted together as securely as when the furnace was built. After the wearing plates had been torn out and the shell was again in place, it was suggested that the top be repaired and the furnace be put in blast with only the new top. A zone of shattered brick, shown in Figs. 3 and 7, was found in the center of the lining and this continued downward to the mantel. The brick was not soft, but was shattered in vertical planes. Most of the zinc and lead was found in this zone. Between some of the planes of cleavage, globules of metallic lead were found. Near the top the globules were minute, some just barely visible; they increased in size, however, lower down. Thirty feet below the top, lead was found in globules ⅛ inch in diameter. Fig. 12 shows some of the lead accumulations, and Fig. 14 some of the brick next to the shell at a distance half way down the stack. Carbon specks can be seen clearly. At many of the joints between the bricks accumulations of green and yellow crystals, chiefly oxides and chlorides of zinc, were found.

The softest bricks near the top contained from nothing to 0.3 per cent zinc and only minute portions of lead. The carbon was not over 2.67 per cent. At all elevations the carbon in the brickwork was highest at the shattered portion in the center of the lining. The analyses of the bricks proper show that the iron content was not exceptionally high, the average being around 2½ to 3 per cent. Alkalies in the brick also were low. The bricks on the outside course were hard and had absorbed considerable iron and alkalies. A view of the inner face of the wall is shown on Fig. 9. A sample of fine brick dust taken undearneath the wearing plate contained 0.52 per cent zinc, 0.1 per cent lead, 2.73 per cent iron, 2.55 per cent carbon, 55.74 per cent silica, 38.68 per cent alumina, 0.47 per cent lime and 0.44 per cent magnesia. This was representative of the most decrepitated brick. It looked like dark blue flint clay and apparently the plastic clay had disappeared entirely.

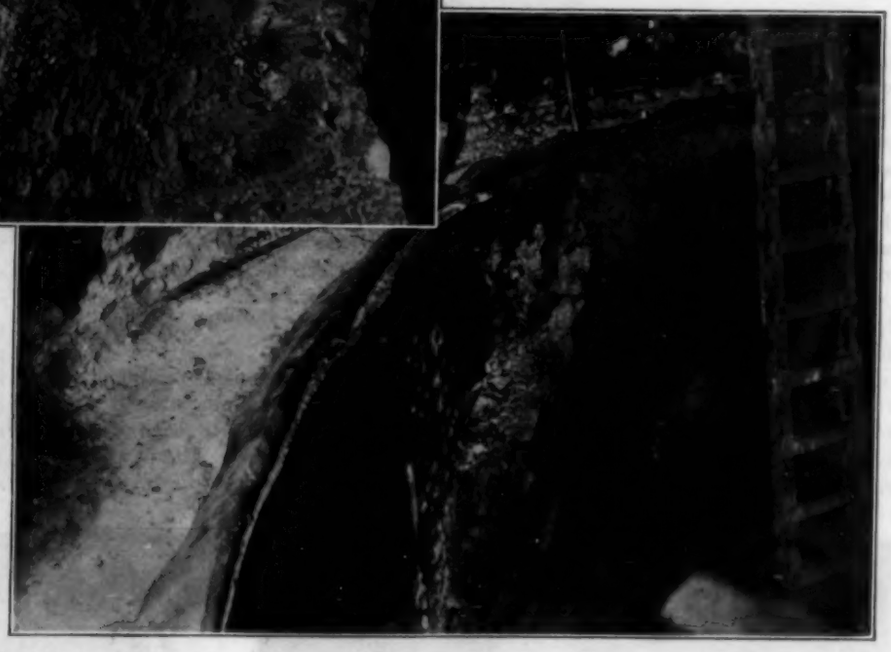


FIG. 8—THE BOSH JACKET SUPPORTING ANGLE WAS TORN AND RAISED 4 INCHES ABOVE THE MANTLE PROPER

Aside from the presence of zinc, lead and carbon, the analysis of most of the brickwork was good, the silica being about 52 per cent and the alumina about 43 per cent. Some interesting analyses of scaffolds are shown on the table. This is the material generally referred to as "made" lining. In the bosh of the

furnace the bricks were exceptionally hard. Many layers of white salt, chiefly potassium carbonate and sulphate were found in this region. Traces of zinc and lead also were found in the hearth and bosh lining. The iron in this brickwork was fairly high.

While zinc and lead were found throughout the entire height of the furnace, they seemed to be concentrated in the middle of the lining. This is perhaps natural, as, if the brickwork was shattered first, there would be more room for the metals to deposit in the interstices. Microphotographs were taken of zinc impregnated brick, but in every case the zinc was deposited mechanically, and there was no chemical combination. normally, zinc and lead would be driven off at the top of the furnace and little would be expected in the brickwork.

The top of "G" furnace was lifted by the increase in volume and height of the column of brick. The greater part of this increase came from the excessive deposition of carbon above and below the wearing plates of which there were 912 in the top, exposing about 8500 square feet of surface through the brickwork to the gases.

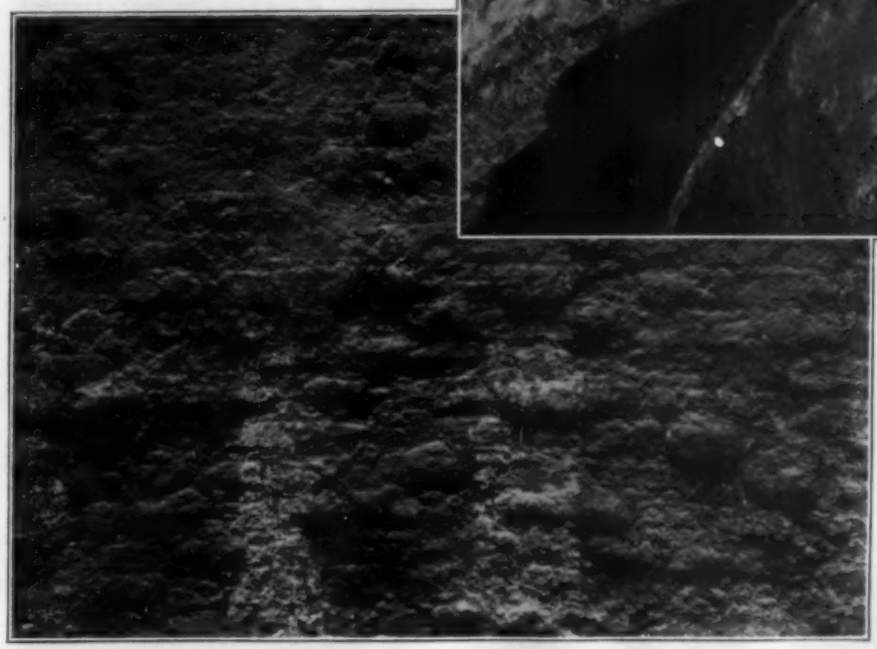


FIG. 9—VIEW OF THE INNER FACE OF THE STACK WALL SHOWING THE IRREGULAR INCRUSTATION

The layers of amorphous carbon found underneath the plates were not there when the furnaces was blown in, but had been added while it was in blast. The warping of the face of the plates caused more gas to be deflected underneath the plates than above. The deposit of carbon was always larger below the plates than above. There were about 20 rows of plates with deposits above and below them. The average thickness of the deposit was at least 5/8 inch. This was an increase of 12½ inches in the height of the brick column. The normal expansion of the brick at an average temperature of 1100 degrees Fahr. would be about 0.35 per cent, or 2½ inches from the mantel to the top. This gives a total of 15 inches. An expansion space of 6 inches had been left below the top, and the entire top was consequently lifted an average of 7½ inches. The force of lifting was applied to the offtake elbow castings. Had the construction of the top been such that the brick below the elbows would have crushed, instead of being solid, the top of the shell probably would have been lifted. The phenomenon of carbon deposition in the wearing plate zone doubtlessly is the primary cause of the shell trouble on the "A", "B", "C" and "G" furnaces. In the past five years more wearing plates have been used than ever before. Carbon deposition has taken place since blast furnaces were invented, but in recent years with more plates the effect naturally has become more intensified.

The "A", "B" and "C" furnaces with light shells sheared the horizontal rivets at one point, and then the vertical seams were burst. These furnaces were double lap riveted throughout and it was easier to shear the seams than to lift the top. On the "G" furnace, with a 1-inch shell and triple butt riveted vertical seams with 1¼-inch rivets, after the horizontal seam was sheared, all the force was exerted vertically, lifting the top instead of pushing out through the side.

FIG. 10—RUPTURE OF BOSH JACKET SUPPORTING ANGLE IS SHOWN NEAR THE SHOVELS

The disintegration in the wearing plate zone, was caused by carbon throughout the brick structure. Here the effect of the binding clay apparently was neutralized by the growth of amorphous carbon between the flint clay particles. This was disintegration, and not shearing, as was found in the stack wall. The carbon absorption had some effect in lifting the top of the furnace, but the amount was small compared with the masses of carbon below and above the plates. The disintegration would have had no effect on a lining failure, as the brick were all in place, back of the plates. Merely the binding had disappeared.

The causes of the shattered zone of brick found throughout the lining is much more difficult to explain than the lifting of the top. Many theories on the cause of shattering have been advanced. The courses of brick next to the shell are comparatively cool and therefore stationary. The courses next to the stack are at a high temperature, and therefore expand. Therefore, the brick in the central courses are ground be-

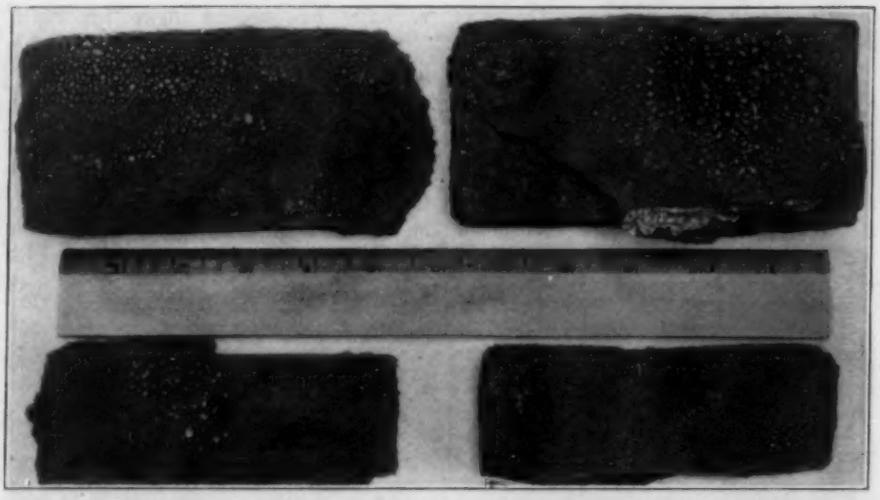


FIG. 12—SPECIMENS OF THE METALLIC LEAD GLOBULES FOUND BETWEEN THE PLANES OF CLEAVAGE ABOUT 30 FEET FROM THE TOP

tween the moving inside and stationary outside courses. This theory was advanced in Germany some years ago, but is not generally accepted in this country.

The next theory was that the shearing and apparent softening of the brick was due to the deposition of carbon. The most favorable temperature for this reaction is 700 degrees Fahr. In other words, given an equal amount of iron throughout the brickwork, the highest percentage of carbon will be at the point where the temperature is 700 degrees Fahr.

Theory Is Not Applicable

According to this theory the shattered zone would have been nearer the shell as the mantel was approached. The percentage of iron in the bricks was approximately the same in all parts of the furnace. More carbon was found in this portion of the lining than in the outer or inner courses. It is questionable whether this was the true cause of the trouble at "G" furnace for the following reasons.

1. If carbon in excess had been deposited in the brick, the result would have been to disintegrate the brick. It should pulverize, and lose its bond and shape. Such was not the case. The brick had their original shape, and were sliced into thin layers, much like a loaf of bread cut with a sharp knife.
2. This zone did not approach the shell as was expected, but was distinctly through the center of the stack wall, ending at the mantel.
3. The iron content of the brick was not high enough to cause excessive carbon deposition.

The next theory was that zinc and lead deposition had shattered the brickwork. There is little actual knowledge about the effect of these metals and their oxide on brick. A bibliography was compiled by the Engineering Societies library, and the only facts gained from it, are that zinc and lead fume, cause brick to spall and fall apart. As with carbon, if zinc and lead had shattered this brick, it would have broken in every direction and not in parallel planes, and the shattered portion would follow the zone of equal temperature. This was not the case, and therefore, the zinc and lead deposition could not have been the cause of the shattered zone.

The foregoing theories did not offer a plausible explanation of the condition found and not until the lining was torn down to the mantel, was there any tangible evidence upon which to base conclusions. The angle, by which the bosh jacket was supported, instead of resting flat on the mantel ring, was raised 4 or 5 inches above the mantel proper, and was twisted and torn as shown in Figs. 8 and 10 around the entire circumference. This angle, 8 x 8 x 1 inches had been blocked up when the furnace previously was relined, and as a result extended up into the brickwork several inches above the point it was supposed to rest.

Bottom of Stack Is Affected

During the last six months of the furnace campaign it had been noticed that the hearth and bosh were lifting slightly.

FIG. 11—LOWER SECTION OF WEARING PLATES SHOWING THE OUTWARD WARPAGE. FIG. 13—THE CAUSE FOR THE BRICKWORK SHATTERING IS ATTRIBUTED TO THE LAYERS OF THE BLACK AMORPHOUS MATERIAL SHOWN BETWEEN THE WEARING PLATES

The blowpipes and coolers inclined up at a slight angle instead of being horizontal. It is probable that the bricks of the hearth and bosh moved up at least 1 inch during the blast. Fig. 3 shows how the zone of broken brickwork ended at the mantel and rested exactly on this angle. It also shows how the zone widens from 8 inches at the bottom to 24 inches near the top. This is a good indication that the force causing the shearing came from below, because the original force would have been disseminated gradually as the distance from the point of application increased.

The final conclusion to be drawn, therefore, is that the constant addition of carbon to the wearing plate zone, raised the brick column until it rested tight against the offtake elbows. Further increases resulted in putting the column under pressure. At some point this pressure sheared the shell rivets and lifted the top. During this period an equal downward force was exerted upon the bricks at the mantel, which also carried the pressure of the weight above. The brick column was forced down on the top of the bosh. The angle representing the top of the bosh was stationary or else had a slight upward movement. This acted as a punch, and forcing its way into the brickwork, caused the vertical shearing.

FIG. 14—SOME OF THE CARBON SPECKS WHICH WERE FOUND ON THE LINING NEXT TO THE SHELL ABOUT HALF WAY DOWN THE STACK

The brick shearing was then due to excessive pressure, caused originally by carbon deposition in the wearing plate zone, forcing the brick column down upon the top of the bosh. The inside and outside of the wall gave, but the center was forced upward. The pressure required to shear bricks at the temperatures involved is not known. Good brick, cold, should carry a load of 1800 pounds per square inch without crushing. This decreases rapidly with increase in temperature. At 1100 degrees Fahr. the brick should carry at least 800 to 1000 pounds per square inch.

The pressure due to the weight of the overlying brick, was 58 pounds per square inch at the mantel. On a brick half way up the stack this pressure was 32 pounds per square inch. Adding the pressure required to break the shell and lift the top, these pressures were increased 366 pounds and 415 pounds, becoming 424 pounds and 447 pounds respectively. If all the weight of the stack was carried on the angle, the pressure exceeded 2000 pounds per square inch. Good brick were found at all levels of the furnace, even the mantel, which indicated that the crushing limit had not been exceeded, except at the point where the angle was forced into the column.

Conclusions derived from the investigation are that:

1. The shell was forced upward by the brick column lifting the top. The increase in the height of the column of bricks was caused by excessive deposition of carbon in the wearing plate zone.

2. The shattered zone of brickwork was caused by the punch like effect of the top of the bosh jacket, as the column of brick was forced down upon it.

3. The brick in the lining were of standard quality, and had nothing to do with the failure of the shell. No brick could have withstood the pressures to which they were subjected, and any brand would have been affected and sheared similarly.

Nothing can be done to prevent the deposition of carbon above and below the wearing plates. Its effects, however, can be practically overcome by decreasing the number of rows of plates from 27 to 20. Then every other plate should be omitted. In this way the number of plates will be decreased from 912 to 294. A vertical section would then cut through only 10 plates instead of 27. To take care of any increase in the height of the brick column, the plates beneath the offtake elbows should be omitted, and replaced with soft brick. This should crush before enough pressure is exerted to lift the top or effect the shell. A dense, hard, high-temperature cement should be used throughout the top of the furnace, to diminish the volume of gas working through the brickwork, and, therefore the carbon deposition. Crushed rock should be used for the cement in the top in place of crushed slag.

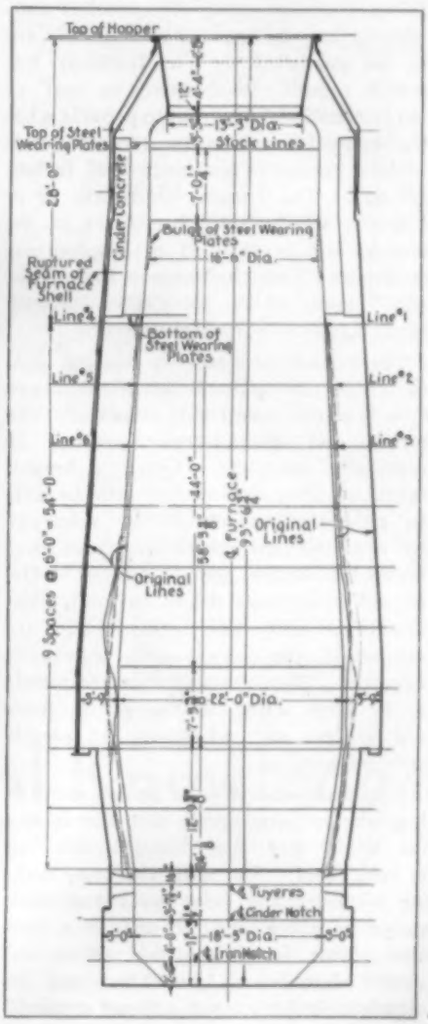


FIG. 15—ARRANGEMENT OF THE CAST-STEEL WEARING PLATES

Specifications should be drawn up, and adhered to, for the purchase of blast furnace brick. This is a large subject in itself and not in the scope of the present report. As a preliminary, it is suggested that:

1. Not more than 10 per cent of plas-

(*Concluded on page* 1827)

Will Compile Scientific Tables

National Research Council Prepares to Publish Basic Chemical and Physical Information on Technological Materials—Data Will Be Complete and Cover a Wide Range—War Brought Out Need for Accurate References

CRITICAL tables of constants, compressing within 2000 pages basic chemical and physical information concerning all chemical substances and technological materials, are to be published by the National Research council, Washington, as part of an international program to provide what the council terms better tools for scientists, engineers and industrial technical men. The volume, which will be in English, will be fully two years in the making and is expected to supplant the incomplete "Landolt-Bornstein-Roth Tabellen" upon which an English-speaking world has been compelled to rely.

The council proposes to marshal data to which the engineer or scientist can turn in every conceivable situation. The metals and alloys tables are to be especially complete. Given a known metal or alloy, the inquirer will be able to ascertain immediately by reference to easily-located tables its exact performance under any condition. Or, should the inquirer desire to know what metal or alloy can meet certain requirements, the answer will be equally apparent. The substances and materials to be dealt with run the gamut from sea grasses and whalebone to metals and refractories.

For years the lack of such a work in English has been keenly felt, but it was the world war that brought this out in bold relief. The men who were making airplanes and large guns and toxic gasses were compelled to turn to a German source for information which the council describes as "imperfect and incomplete, badly indexed and not critical." Pre-eminent as the United States is in the production of iron and steel, even the latent heat of fusion of iron and steel is in doubt, the guesses at it varying from 33 to 60 units, as the council points out.

Thus in 1919, at the meeting of the International Union of Pure and Applied Chemistry in London, the research council, which constituted the American representation, submitted a plan for the international compilation of critical tables. The union at this meeting and the International Research council later gave their approval. The National Research council undertook both the financial and editorial responsibility. Due to the industrial depression which set in at the time the council was about to seek the $200,000 necessary for the work, the task of raising funds has been deferred until this time, although $77,000 already has been pledged. The editorial work, however, has been carried forward and a definite organization whipped together.

The board of trustees, to which has been entrusted the financial responsibility, is chairmaned by George P. Adamson, director of research of the General Chemical Co. Its secretary is William M. Corse, chairman of the division of research extension of the council. Other members are Harrison E. Howe, editor of the *Journal of Industrial and Engineering Chemistry;* Edward B. Craft, chief engineer of the Western Electric Co.; Hugh K. Moore, chief chemical engineer of the Brown Co.; Charles L. Reese, chemical director of E. I. du Pont de Nemours & Co.; and Julius Stieglitz, professor and chairman of the department of chemistry, University of Chicago.

Editorial Board Named

Directing the editorial board is Edward W. Washburn, formerly professor of physical chemistry at the University of Illinois. Assisting him are Dr. George K. Burgess, director of the bureau of standards; Saul Dushman, physicist, General Electric Co.; John Johnston, Sterling professor of chemistry, Yale university; C. E. Kenneth Mees, director of the research laboratory of the Eastman Kodak Co.; Charles E. Mendenhall, professor of physics, University of Wisconsin; and Richard B. Moore, formerly chief chemist of the bureau of mines and now director of development for the Dow Co., New York.

This editorial board has, in turn, created an editorial staff which is devoting its entire time to the project. Mr. Washburn is editor-in-chief. His two assistants are Clarence J. West, formerly scientific associate of the council's information service, and N. Ernst Dorsey, a physicist formerly with the bureau of standards. Approximately 400 men, each schooled in the general field of physical measurement, are to serve as cooperating experts. Walter Rosenhain, who is superintendent of the metallurgical division of the National Physical Laboratory of Great Britain, which corresponds to the United States bureau of standards, has consented to the cooperating expert for all metallurgical data. For every class of material concerning which data are given there will be a co-operating expert.

In the published tables the chief language will be English. But to give the work an international character of helpfulness, the introduction, tables of contents, definitions, general explanatory matter and indices will also be in Italian, French and German. Part I of the tables will relate wholly to the pure metallic elements and substances, and part II to the commercial elements and substances. The schedules for alloys, amalgams and commercial metals are typical of the great detail with which the tables will be prepared.

Table *A* will list the alloys in alphabetical order of names, each alloy being given an index number. In Table *B* the alloys will be listed in classes as, for example, brasses, bronzes, aluminum alloys, rare metals and the like. Within each class the alloys will be arranged in the order of decreasing per cent of one constituent. This table will contain the chemical compositions of the various alloys and the alloys will be numbered consecutively throughout the table, these numbers being the index numbers of the alloys. By consulting Table *A* and then Table *B* the composition of any alloy can be obtained.

The properties of the various alloys will be given in a series of property tables labeled Table *C*. Within each property table the alloys will be arranged in decreasing order of the values of the property in question, the table containing the index number of the alloy and the value of the property in question. Table *D* will consist of a summary of the properties of the chief alloys. These properties will, of course, be available by tracing the alloy in question through the preceding tables. But Table *D* will list the properties of the principal steels, the typical brasses and such alloys as duriron and monel metal. Table *E* will comprise, in graphical form, the data which relates to metallic systems which have been systematically investigated for the purpose of correlating a given physical property with chemical composition, heat treatment or mechanical treatment.

The following are the properties of alloys, amalgams and commercial metals to be covered. It is understood that so far as data are available they will be given for both the crystalline and the liquid metals and to include variation

with temperature, pressure, heat treatment, mechanical treatment and the like where these factors are significant.

I. MECHANICAL

Strength

(a) Tensile (measured on original area)

1. Tensile strength, that is, the maximum point on the curve
2. Yield point
3. Proportional limit
4. Elastic limit

(b) Compressional

5. Compression strength, that is, maximum stress before fracture, where such maximum exists
6. Amount of compression under various stresses, for cases in which no maximum exists
7. Yield point in compression
8. Proportional limit in compression
9. Elastic limit in compression
10. Surface compression, or "bearing strength"

(c). Cross bending

11. Modulus of rupture, that is, maximum fiber stress at fracture computed as if the deformation followed the Euler-Bernouilli relation (N=SI/C) up to rupture
12. Proportional limit similarly calculated
13. Elastic limit similarly calculated

(d) Shearing

14. Maximum shearing stress

(e) Torsion

15. Modulus of rupture in torsion, that is, maximum shearing stress and strain calculated as if the shearing stress in torsion remain proportional to the radius up to rupture
16. Yield point in torsion
17. Proportional limit in torsion
18. Elastic limit in torsion

(f) Impact

19. Impact strength, that is, energy used in fracture
    - Charpy machine
    - Izod machine
    - Fremont-Guillery machine

(g) Fatigue

20. Fatigue limit
    - Upton-Lewis machine
    - Rotating beam
    - Cantilever
    - Two-point loading
21. Impact fatigue
    - Eden-Foster
    - Homatko
    - Stanton

Elasticity

22. Modulus in tension
23. Modulus in shear
24. Bulk or compressional modulus
25. Poisson's ratio
26. Some typical hysteresis diagrams
    - Bairstow
    - Dalby
27. Coefficient of restitution

Hardness

28. Scratch
    - Sclerometer
    - Beerbohm
29. Brinnel
30. Impact
    - Martel
31. Scleroscope

Ductility

32. Elongation
33. Reduction in area
34. Results of cold bending and reverse bending tests
35. Results of the twisting test
36. Viscosity

(a) Data concerning the rate of damping of torsional oscillations of long rods in the case of solids

(b) Coefficient of viscosity, poises, in the case of liquids

37. Density
38. Coefficient of compressibility
39. Surface tension

II. THERMAL

40. Phase rule diagrams and cooling curves
41. Coefficient of thermal expansion
42. Pattern makers shrinkage
43. Heat capacity (specific heat)
44. Thermal conductivity (including diffusivity where directly determined)
45. Convective losses and coefficients of heat transfer
46. Annealing temperature, tempering temperature, quenching temperature, carburizing temperature, etc.
47. Latent heat of phase changes

III. OPTICAL

48. Reflectivity
49. Spectra of reflected and transmitted light
50. Emissivity

IV. ELECTRICAL

51. Resistivity, including effect of other metals on resistivity of copper. Temperature coefficient
52. All magnetic properties, for example, magnetic force, coercive force, flux density, retentivity, permeability, susceptibility magneto-striction, transverse effects, etc.

V. CHEMICAL

53. Corrosion

VI. CRYSTALLOGRAPHIC

54. All crystallographic data, including crystal structure determined by X-rays

VII. PHYSICOCHEMICAL

55. Vapor pressure and boiling points
56. Permeability to gases

Future Depends on Chemical Knowledge

BY BRADLEY DEWEY

EVERY phase of steelmaking development has been a triumph of organization. Today the progress of chemistry, applied theoretical physics, and chemical engineering is usurping the place and leadership held during the last forty years by the progress in mechanical engineering and electricity. With chemistry growing so rapidly we now have the problem, how is the steel industry to organize this growth?

A generation ago a doctor was a doctor, and a chemist was a chemist. Just as medicine has grown so large that no one man can know it all, so chemistry has grown to a point where there are many distinct fields, and where the problem of correlating and using the available information is becoming increasingly more difficult. The specialized steel chemist will be the first to admit that he cannot give proper and adequate service to the daily operation and routine development of his organization and also correlate and apply the possibilities of these specialized fields. Consider a few examples.

Some men are obtaining an adequate visual picture of the makeup of an atom. Will this work help the technology of steel? Who is going to tell us why one-quarter per cent of copper retards the atmospheric corrosion of steel? Is it going to be a physical chemist or a colloidal chemist? Will the answer open up new possibilities?

Lubrication has been considered a part of the field of the mechanical engineer, but the application of modern colloidal chemistry is opening up new vistas, and the problems incident to the lubrication of hot roll necks, bearing flooded with water, wire drawing, and the like, are well worthy of review by the best of the new school of chemists. There are prospects that, through liquid air, we may obtain oxygen in the neighborhood of $5.00 per ton. The large use of this would, of course, bring with it a host of problems for the specialist in refractories, but would it not also bring with it problems for the best of our physicists and physical chemists? Some may dream that it would even make giant superpower gas producers of our blast furnaces, and make pig iron a by-product.

The Bucher process for nitrogen fixation is showing more promise and is turning out pure iron as a by-product. A large development of this might bring the iron and steel industry into contact with still another chemical field. The processing of all kinds of fuel, the complete gasification of coal, and

Discussion on paper presented by William A. Forbes at the meeting of the American Iron and Steel institute, New York, May 25, and published in IRON TRADE REVIEW June 7, page 1672. Mr. Dewey is president, Dewey & Almy Chemical Co., Cambridge, Mass.

the structure of cokes made by newer processes, call for imagination reinforced with up-to-date technical knowledge. The same is true of the problems incident to the possibilities of saving fuel through central station distribution of new high pressure gas.

In short, the chemical organization of the iron and steel industry of the future must make use of specialists in physics, physical chemistry, radioactivity, metallography, special precision instruments, metallurgy, absorption of gases, electrochemistry, electric furnaces, heat treatment, refractories, thermodynamics, phase rule diagrams, spectroscopy, and also chemical engineers of both specialized and consulting experience in the great host of other process industries.

When planning the future of chemistry in the iron and steel industry, the steel executive must apply his best talents to the mechanism and organization which are to make useful the ever increasing mass of chemical knowledge.

Moisture a Problem in Furnace Linings

BY J. H. FRANCE

THE disintegration of blast furnace linings is a subject which has long disturbed the minds of manufacturers and operators alike. Certain conditions which have come up and have been observed during long years of experience in fire brick manufacture have led me to believe that moisture was the cause of the trouble at least its arch enemy. It has been stated that this disintegration takes place soon after the newly lined furnace is put in blast. This I firmly believe.

While reluctant to recommend any special treatment of newly lined furnaces the subject is of such importance that I believe a few remarks based on my experience will not be out of place.

If a fire brick be not thoroughly dried out before setting into the kiln and if the kiln be closed and fired rapidly, or the heat be too great to permit the rapid escape of the moisture it would result in the interior of the brick becoming anywhere from a pink to a black color, dependent upon the percentage of moisture the brick contained, the rapidity at which the early firing advanced and the percentage of open draughts for the escape of kiln steam from the brick and burning fuel.

Slow burning or drying out with plenty open and free draughts in the early stages will drive off this moisture and result in a perfect burn without discoloration.

An entire kiln of brick virtually filled with moisture can be burned off without showing any discoloration, provided low temperature firing is adhered to for a proper period and ample draughts are kept open during the process of drying out, allowing the steam generated thereby to escape.

A blast furnace lining built in with brick already filled with atmospheric moisture, increased by dipping and increased still further by grouting during erection, results in the brick becoming filled with practically as much moisture as during the process of manufacture.

Heat drives moisture away; consequently as the interior of the furnace increases its heat, the moisture is driven away from the inner face of the lining and if the furnace is fired hard with the top closed the escape of the moisture is prevented and it is confined in the lining at some distance from the inner face. As the heat increases the moisture is converted into steam which softens the brick to a state of plasticity. Eventually with the complete drying out of the brickwork the bricks at such locations are disintegrated, the degree of disintegration whether shattered granular or powdered depending on the conditions.

Basing deductions upon these physical facts, I am led to believe it within the bounds of reason to say that it was not absorption of carbon or other metallic vapors from the smelting ores that caused disintegration, but moisture alone.

Discussion of a paper presented by C. E. Nesbitt and M. L. Bell at the New York meeting of the American Iron and Steel institute, May 25, and published in IRON TRADE REVIEW, May 31, page 1603. The author is general manager, General Refractories Co., Philadelphia.

Repairs Flask Pin Holes by Arc Welding

Repairing of worn flasks is one of the most recent applications of arc welding in foundry practice. According to the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., this operation is proving most economcial. From use the holes in the malleable iron lugs on flasks wear to such a large diameter that the pins on the other parts do not fit sufficiently tight to hold the parts in good alignment. To make repairs, the practice in the past has been to ream out the holes to a diameter of ⅞ inch and then to press in a bushing having the right diameter hole, namely ⅝ inch. When the bushing wears too large it is replaced with a new bushing.

The new method of repair is claimed to be less expensive and more satisfactory. The holes are reamed out to a ⅞-inch diameter and then filled completely using the metallic electrode arc welding process. A piece of copper is placed under the hole and the welding is done using about 175 amperes and a 5/32-inch diameter welding wire. The time required to weld one hole is about 3 minutes. A new hole of about ⅝-inch diameter then is drilled in the new metal. When these holes are again worn oversize, it is not necessary to ream them out before the welding operation. The time to weld a hole thus is reduced to about 2 minutes. The cost of welding each hole as originally drilled to the ⅞-inch diameter is about as follows: Labor at 70 cents per hour 0.035 cents; welding wire at 8 cents per pound 0.016 cents; electric power at 3 cents per kilowatt-hour 0.013 cents, making a total cost of 0.064 cents.

The question naturally arises as to why it is necessary to drill a ⅞-inch hole in the casting when only a ⅝-inch hole is required for the pin on the flask. The reason is that there is a layer of hard chilled high carbon cast steel about 1/16-inch thick in the region where the deposited metal unites with the casting, therefore it is necessary to have the original hole ¼-inch larger than the final hole so that no difficulty will be experienced in drilling the final hole through the deposited metal.

Overoxidation Cause of Shelly Strip Steel

The result of an analysis of data on open-hearth practice resulting in shelly strip steel, made by F. B. Foley, metallurgist at the Mississippi Valley experiment station of the bureau of mines, Rolla, Mo., showed that heats which produce shells are shorter heats, that they take more ore, and less spar and that they give a lighter ladle skull than those that produce metal free from shells. The indication is that shells are the result of running the heat in the open hearth too hot and bringing down the carbon too fast by oreing. The metal is thus apparently overoxidized.

Tin Affects Behavior of Steel

Is Rarely Found in Iron Ores, but Is Usually Present in Steel Made with Scrap—Small Quantities in Medium Carbon Steel Liable To Impair Ductility—Rails May Be Made Unsafe

BY J. H. WHITELEY AND A. BRAITHWAITE

ALTHOUGH important quantities of detinned sheets in the form of bundle scrap have been used for many years in the manufacture of steel by the open-hearth processes, comparatively little attention has so far been given to the effect of this material on the finished product. The use of such scrap always causes a small percentage of tin to be present in the steel, for it does not appear possible to remove it completely from the relatively large bulks operated on in the detinning plants. The amount remaining is variable, but seldom there is less than 0.05 per cent, and frequently more. Considerable difference of opinion exists among steelmakers as to the advisability of using scrap of this kind in steel production; while some assert that it is harmful, others apparently believe that it has no ill effect.

Tin is rarely, if ever, to be found in iron ores, and when present in steel must consequently have been derived from the scrap used. Experience indicates that practically the whole of the tin thus added to the charge is retained in the steel and is not removed either by the slag or by volatilization. Nor does it appear necessary that it should be actually in combination with the sheet. The authors recently have observed instances in which the tin was present within the bundles almost entirely as a constituent of a dark brown powder or sludge, apparently due to insufficient washing, and the use of 40 per cent of this scrap in the charge gave up to 0.30 per cent in the steel.

A summary of the few investigations which have been made on the effect of tin in steel is contained in a paper given by Dr. Stead a few years ago on "The Influence of Some Elements on the Mechanical Properties of Steel." Briefly, the work there recorded showed that sensible quantities of tin raised both the yield point and maximum stress and also increased the hardness of steel when hot. Ledebur found that 0.1 per cent in low carbon steel raised the breaking point 1.4 ton and reduced the elongation by 0.8 per cent. Dr. Stead doubts whether 0.05 per cent is harmful for plates, rails, and heavy forgings, but states that more research is needed before any definite conclusion can be reached.

Use Drop Test on Rails

The author's attention recently was drawn to the seemingly deleterious effect of tin in steel through the failure under the drop test of a number of 100 pounds basic steel rails in the manufacture of which a certain amount of detinned scrap had been used. These rails were singularly brittle; a number failed to withstand the test, which consisted in placing a length of 6 feet across bearings 3 feet 6 inches apart and subjecting it to the blow of a 1-ton weight falling from a height of 30 feet. The fractures were reported as frequently occurring at the supports, and thence travelling apparently along the flange into the web. Except for the presence of tin up to 0.1 per cent, the composition of these rails was practically identical with that of many thousands of tons which had previously been made by the same process and found satisfactory.

It should be mentioned that these tests were made during a period of wintry weather when the temperature frequently was below zero, and although 100-pound rails rolled to this particular chemical specification had been tested under similar conditions in previous years without failure, it seemed possible that frost might be the cause of the trouble. To ascertain whether this was the explanation, suitable lengths of the faulty rails were normalized and again tested at ordinary temperature. The results were far from satisfactory, for some of the lengths still broke, and it was clear that this treatment had failed to eliminate the brittleness entirely.

Macroscopic examination gave no indication of any pronounced segregation in the rails when the usual tests were applied, and, judging from the appearance of the fractures, the grain size in each instance was quite normal. Moreover, no defects which might lead to failure could be detected on the surfaces after the scale had been removed, nor did the fractures appear to have originated in this way. Microscopic examination of sections cut from different parts of the rails likewise failed to afford any explanation of the brittleness. The structures, which consisted of a network of ferrite enclosing areas of fine lamellar pearlite, were almost identical and typical of this class of steel. Further, few slag inclusions were to be observed, and the most careful examination under a high magnification did not reveal the presence of any minute cavities or flaws; the steel appeared to be sound and of good quality.

Since no elucidation of the problem could be found by the above means, it began to appear probable that the brittleness was due to the presence of tin in the steel. Further, a comparison of the mechanical properties of several of these rails and of non-

From a paper presented at the London meeting of the Iron and Steel institute, May 10-11, 1923.

Table I

Analysis of Steels Used in Mechanical Tests

Number	Cubic centimeter	Silicon per cent	Phosphorus per cent	Sulphur per cent	Manganese per cent	Tin per cent	Copper per cent	Arsenic per cent	Maximum stress tons per square inch	Elongation in 8 inches per cent	Brinell number	Izod test, 1/32-inch V-notch Length	Cross.
1....	0.165	0.02	0.074	0.066	0.55	nil	0.047	0.031	30.2	24.0	130	65	42
2....	0.17	0.02	0.069	0.060	0.55	0.31	0.030	0.048	33.8	21 0	156	17	13

brittle rails free from tin seemed to support this explanation, for in certain respects the tin free steels were decidedly superior. Typical results obtained from two samples of each kind are given later, while the analyses of the four samples are recorded in Table II.

Try Bend and Tensile Tests

Length strips of equal size, ½-inch thick, were cut and then bent until fracture occurred. The test showed plainly that the steels not containing tin were the more ductile, for these pieces could usually be bent through 170 degrees, whereas the other seldom passed 120 degrees.

The following results were obtained, the chief feature of which was the low elongation of the steels containing tin:

Number	Maximum stress, tons per square inch	Elongation in 3 inches per cent
1	50.8	16.5
2	51.2	15.0
3	53.0	5.0
4	52.2	5.0

Sections were first prepared with a V-notch of standard size for the Izod impact test. The energy absorbed in breaking in all cases was too small to allow a satisfactory comparison to be made. A fresh series was therefore taken and tested with a V-notch 1/32 inch deep; this was found to be more suitable. The following figures are, in each instance, the average of at least two tests. A second series of results was also obtained by first oiling the pieces and then allowing them to stand for half an hour before testing in a freezing mixture at about minus 10 degrees Cent. The values for these are also given in the following figures and it will be seen that, in both series, the steels not containing tin gave the best results:

IZOD TESTS

Number	15 per cent Head	15 per cent Flange	10 per cent Head	10 per cent Flange
1	18.5	27.0	14.5	18.0
2	14.0	17.5	14.0	15.5
3	12.0	12.5	11.0	12.5
4	10.0	8.5	7.5	11.0

The interior quality of samples 3 and 4 revealed by the above tests could only be accounted for by the presence of tin in the steels, and it thus seemed reasonable to conclude that the brittleness under the drop test really was due to this cause. Moreover, this conclusion seemed to be supported by the fact that when the use of scrap containing tin was discontinued no further trouble was experienced.

An endeavor next was made to ascertain directly the effect of tin in small quantities on the mechanical properties of rail steel. For this purpose three small ingots from the same heat were cast, adding to two of them amounts of tin approximately equal to 0.1 and 0.2 per cent respectively. This was done in the following manner. Three 150-pound brass foundry crucibles were heated for half an hour or so over coke fires and then placed in position as the furnace was being tapped. After several ordinary ingots had been teemed, the ladle was placed over the crucibles and the first was filled without any addition of tin. As the second began to fill, a rod of tin sufficient to give 0.12 per cent in 150 pounds was held in the stream of metal by means of a long pair of tongs and allowed to melt at a fairly steady rate, so that when the crucible was full only the small end held by the tongs was left. To the third crucible,

BARS USED IN BEND TEST. TOP PAIR CONTAINED NO TIN, MIDDLE PAIR, 0.12 PER CENT TIN, AND LOWER PAIR 0.20 PER CENT TIN

roughly 0.2 per cent of tin was similarly added. The steel did not set rapidly, and subsequent tests showed that a moderately good distribution of tin in both ingots had been obtained in this way.

When cold, the ingots were stripped and removed to the blacksmith's shop, where they were forged down to billets of suitable size for rolling. Finally, they were reheated and rolled into flat bars 3½ x ½ inch in section, and allowed to cool together on the mill floor. Every precaution was taken to insure, as far as possible, equal heat treatment throughout. No tin was present in the cast as tapped, but it was afterward found to contain rather more nickel and chromium than was present in the rail steels previously considered.

For the mechanical tests the middle portion of each bar was selected, as it was thought that the distribution of the tin would be more uniform here than at the ends. Several determinations for tin were made on drillings taken from different parts of these lengths, and the results showed that the tin content did not vary more than about 0.05 per cent in either. A number of tests also were made in which the distribution of tin across the bar was examined. The amount present near the surfaces was repeatedly found to be less than that in the central part around the axis, from which it was concluded that tin tended to segregate.

Sections from the middle lengths, when etched and examined under the microscope, appeared to be identical in every respect.

For the bend tests, two lengths 13 inches long from each bar were taken. Bending at once revealed a striking difference. No. 1 pieces bent through 180 degrees and did not break; those from No. 2 broke before 180 degrees was reached; pieces from No. 3 broke at about 80 degrees as shown in the accompanying illustration. The effect of annealing also was tried. Three strips were heated to 840 degrees Cent., cooled in the furnace, and then bent, but this treatment made no apparent difference; as before, the brittleness increased with the tin content.

Small Quantity Of Tin Harmful

The results obtained by the other methods of testing are given in Table II. Taken as a whole, they appear fully to support the conclusion, previously reached, that even a small quantity of tin in medium carbon steel is harmful.

It should be remarked here that no difficulty in rolling either the rails or the bars was experienced; the presence of tin did not seem to affect the plasticity of the steel at rolling temperatures. This, however, was not the case with mild steel used for the manufacture of plates. Here, red shortness was pronounced when the tin content exceeded 0.15 per cent; ingots weighing 5 and 7½ tons cracked badly in cogging. In the present case, the highest content of tin observed was 0.31 per cent. The usual mechanical tests did not show the 0.3 per cent of tin had any deleterious effect on plates ½ inch or less in thickness. Bends both length and cross were quite satisfactory; but with thicker plates cross bends especially were often decidedly brittle when the tin content exceeded 0.20 per cent. The results given by two plates, ⅜-inch thick, rolled in the same mill and similar in composition, except that one contained 0.31 per cent of tin, are recorded in Table I. The impact figures, in each case, are the

average of the three closely agreeing results.

Experimental evidence is advanced showing that the presence of small percentages of tin in medium carbon steel is liable seriously to impair its ductility, so that in rails even 0.06 per cent may be unsafe. The harmful effect of tin apparently increases with the carbon content, for in mild steel the above amount apparently, has no detrimental effect. The degree of brittleness produced by tin appears to be influenced also by the heat treatment given; it may be remarked here that several observations have been made which suggest that, in investigating the effect of tin, factors such as the finishing temperature and the amount of work applied to the metal in rolling or forging must not be overlooked.

Describe Method of Estimation

Since methods for the estimation of small amounts of tin in steel are seldom included in manuals dealing with iron and steel analysis, it was thought that the following description of a method which has been found to work satisfactorily might be useful.

Dissolve 10 grams of drillings at about 90 degrees Cent. in 100 cubic centimeters of hydrochloric acid, 1.16 specific gravity, and 50 cubic centimeters of water. When solution is complete, add another 50 cubic centimeters of water and pass a rapid stream of sulphuretted hydrogen through for a few minutes. This serves to precipitate the arsenic and some of the copper, while the tin remains in solution. Filter the hot liquid through a paper into an 18-ounce beaker, taking care to allow the whole to pass through before adding the washings. Boil off the sulphuretted hydrogen, and about 200 cubic centimeters of cold water, and neutralize with ammonium hydrate. Just redissolve the precipitated ferrous hydrate in hydrochloric acid and precipitate the tin as sulphide. Collect the precipitate on a pulp filter and wash repeatedly with a 2 per cent solution of hydrochloric acid to remove completely all iron salts. Place the pulp in the beaker and pour through the funnel into the beaker a mixture of 40 cubic centimeters of bromine water, a few drops of bromine, and 5 cubic centimeters of hydrochloric acid. Bring the liquid to a boil and gently drive off most of the bromine; filter by suction and wash well. The filtrate contains the tin present in the sample. As a precaution, however, it is as well to dry and ignite the pulp in a porcelain basin; there should, of course, be no appreciable residue.

There are several ways in which the tin may now be estimated; of these the two following have been found to give good results with samples which are known to contain definite quantities of tin.

Volumetric, as described by Ibbotson and Aitchison. Place the filtrate in a conical flask of about 500 cubic centimeters capacity, add 50 cubic centimeters of hydrochloric acid, and boil down to about 40 cubic centimeters. Add 20 cubic centimeters of hot water and 0.5 gram of finely powdered antimony. Boil the liquid for a few minutes and then cool it in an atmosphere of hydrogen. Titrate the cold solution with N/10 iodine. A blank test should be made on the acid used.

Gravimetric.—Bring the filtrate to a boil and add a slight excess of ammonium hydrate. Filter the white precipitate of stannic hydrate and wash the paper twice with water. Dry the paper in a porcelain basin and ignite, first at a low red heat in plenty of air over a bunsen burner, and then in a muffle at a bright red heat. Weigh as SnO_2. When copper is present in appreciable amounts, a little cupric hydrate is usually precipitated with the stannic hydrate, giving it a bluish color. This may be removed either by dissolving the precipitate off the paper in hot dilute hydrochloric acid and reprecipitating with ammonium hydrate, or by heating the ignited residue in strong nitric acid until it is quite white. If the latter course be adopted, the filtrate should be diluted and rendered slightly alkaline with ammonia to make sure that no tin has passed into solution.

Table II

Analysis of Four Samples Used in Drop Test

Number	Cubic centimeters	Silicon per cent	Phosphorus per cent	Sulphur per cent	Manganese per cent	Tin per cent	Copper per cent	Arsenic per cent	Chromium per cent	Nickel per cent
1.....	0.54	0.09	0.025	0.057	0.74	nil	0.03	0.035	0.065	0.016
2.....	0.58	0.14	0.025	0.047	0.79	nil	0.032	0.034	0.070	0.019
3.....	0.56	0.11	0.036	0.056	0.77	0.076	0.03	0.026	0.070	0.024
4.....	0.58	0.12	0.023	0.051	0.79	0.084	0.032	0.034	0.085	0.019

Table III

Results of Other Methods of Testing

Number	Brinell Number	Maximum stress, tons per square inch	Elongation in 3 inches, per cent	Reduction in area, per cent	Izod test 1/32-inch V-notch
1.....	241	53.5	19.0	34.5	12.0
2.....	241	53.5	5.0	5.6	12.0
3.....	260	52.6	5.0	6.0	6.0

1922 Stone Sales Large

Stone sold in the United States in 1922 totaled 81,000,000 net tons valued at $118,500,000, of which furnace flux, limestone and marble, accounted for 16,600,000 gross tons valued at $13,800,000. The 1921 sale of furnace flux was 9,525,000 gross tons valued at $9,547,946 out of total sales of 63,538,740 net tons of stone of all kinds valued at $106,962,266, according to the federal geological survey. In 1922 sales of refractory stone, including ganister and dolomite, reached 600,000 net tons valued at $720,000, against 496,150 net tons valued at $643,638 in 1921.

Tests Strength of Wire Rope Over Sheaves

To determine the strength of wire rope at the point where it passes over the sheaves, the United States bureau of standards has conducted a series of tests recently, having the rope connected between two sheaves, one on each head of the testing machine. The rope was socketed and was made continuous after placing on the sheaves by joining the sockets. The tests indicated that the rope usually broke where it left the sheave. Ropes used were ⅝, ¾, ⅞, 1 and 1¼-inch in diameter, and the sheaves were 10, 14, and 18 inches in diameter. It was shown that the strength of the rope was less as the sheave became smaller.

Taking the strength of the straight rope as 100 per cent, the strength of a ⅝-inch rope over sheaves was 87.4 per cent for the 10-inch sheave and 95.3 per cent for the 18-inch sheave. The larger rope had a much lower strength, as the 1¼-inch rope had a strength of 75.8 per cent on the 10-inch sheave and 84.7 per cent on the 18-inch sheave. Some of the tests were made under repeated loads representing approximate working conditions while others were made under loads which were gradually increased to the ultimate. The elongation and the decrease in diameter were measured and conclusions drawn about the behavior of wire rope under service conditions. The results of the test are embodied in Technological Paper No. 229 of the bureau of standards.

Producing Steel Free from Dirt

Application of Colloid Chemistry Offers Possible Solution of Problem of Eliminating Impurities in Steel—Present Day Metal Is Relatively Clean—Dirty Steel Is Unreliable and Dangerous

BY H. W. GILLETT

MANY parts of automobiles, aircraft, etc., that require strong light construction and must be made of high quality steel, are stressed to the maximum limit only in a small volume. In parts subject to bending stress a line or even a point may take the maximum stress.

A series of endurance tests under repeated bending in progress in the United States bureau of mines laboratories, like similar tests by other investigators, has shown the great difference in life of sister bars of the same steel, handled in the same way and tested at the same nominal stress. It is known that a surface notch or scratch greatly increases the local stress over the nominal calculated stress; internal notches, such as those formed by inclusions or sonims, probably have a similar effect.

From the tests made by the bureau of mines, the cleanliness of the steel at the dangerous section or point of maximum stress, seems to be one of the most important factors in determining the life of the piece. The more localized the stress, the more does chance rather than the average properties determine the life of the steel. The usual test, consisting of a tension test of a bar taken longitudinally, is not sensitive to the local drop in strength, or tendency to increase the true local stress over the nominal, because of inclusions, which probably have a more injurious effect in hard heat-treated steels, such as must be used when great strength is sought, than in softer steels.

Dirty Steel Has Low Ductility

Users of steel making transverse tests find surprisingly low ductility on transverse bars of dirty steel although the longitudinal tests may be good. Bending tests, reverse bending tests, and notch bar impact tests, all of which as usually made test a definite limited volume rather than a large volume, are sensitive to the effect of inclusions and tend to disclose dirty steel. These tests, coupled with microscopic examination of unetched specimens, will show the general condition of a steel, but as the cleanliness may vary widely in small distances, none of the tests will show the condition at the danger point of a piece in service. For this reason the factor of safety, with its attendant increase of weight, must be used.

Inclusions Cause Failures

A large proportion of failures in service are due to fatigue breaks, that is, those resulting from a progressive failure that starts from a definite nucleus. Such a failure often is traceable directly to an inclusion. In many other cases, the connection may be missed because in polishing the specimen for microscopic examination the material at the actual nucleus must be removed, thus destroying the evidence.

Other sources of nuclei for fatigue failure are poor surface finish; irregularities in structure, poor annealing or poor heat treatment; unrelieved quenching strains; etc., but these causes are avoidable more or less by the used of the steel. Inclusions cannot be eliminated from the steel; they may be only prevented. Once dirty steel is frozen nothing can be done to remedy it.

If steel were transparent, so that the dirt would be obvious, more methods for its elimination would have been sought and greater care would be taken in its prevention. The need for clean steel is becoming more and apparent and more and more pressure is going to be brought to bear on the maker to produce it.

Dr. J. A. Mathews, calling attention to the need for clean steel in connection with the electric furnace, says "when users acquire a full appreciation of what clean sound steel means in terms of national efficiency, safety, and economy, we shall see more rapid growth." Almost every page of the recent book by Giolitti emphasizes the bad effect of dirt in steel. A large list of authorities can be cited to show that dirty steel is dangerous, but the situation is so obvious that a piling up of proof scarcely is needed. All that is said about dirty steel is equally true of nonferrous alloys, duralumin in dirigible construction for example; but this paper will be confined to steel.

What constitutes dirty steel is a matter of definition and comparison and the definition will vary with the point of view. We shall define clean steel as steel with nothing that is not in solid solution in the austenite field. Everything else is dirt. No such steel has been made, and perhaps never will be. Comparatively clean steel is made, for example the electric furnace steel described by Priestley. Mathews says that Priestley's results are due to clean steel; but photomicrographs show that only relatively clean steel was made. While the electric furnace steel from careful and experienced makers necessarily is not clean, generally speaking, crucible and electric steels are cleaner than acid open-hearth steel, which is cleaner than basic open-hearth steel, and this, in turn, is cleaner than converter steel.

May Reduce Dirt In Steel

As Giolitti points out, the source of the dirt, dirt being a shorter and more expressive word than inclusions or sonims, lies in the fact that molten steel is an emulsion of liquid steel and liquid or solid dirt, sulphides, oxides, silicates, slag, etc. The amount of emulsified dirt may be reduced by using raw materials relatively free from dirt, by deoxidation, and by combining the sulphur as manganese sulphide and washing this out with a slag that will convert it to calcium sulphide, which is soluble in the slag but insoluble in the steel. It is essential to the breaking up of the emulsion that time be given for the steel to lie quiet and allow the dirt to rise, just as cream rises in milk. Complex deoxidizers, such as magnesium; manganese and silicon sometimes are used with the object of forming an oxide mixture of low melting point and viscosity, which more readily will coalesce and rise.

Agitation of the bath previous to the quiet stage probably makes for coalescence and agglomeration of the dirt into larger particles, which will rise more readily though there is the attendant danger of emulsifying with the steel some slag that was not previously in suspension. Some authorities advocate "boiling" the bath, others prefer to hold the agitation

---

From a paper presented at the New York meeting of the American Institute of Mining and Metallurgical Engineers, Feb. 19-21. The author is chief alloy chemist, United States bureau of mines, Ithaca field office, Cornell university, Ithaca, N. Y.

to the minimum; all agree that a final quiet stage under nonoxidizing conditions is essential. Crucible melting allows this to a high degree, electric furnace melting to almost as high a degree, while open-hearth melting is less favorable to those conditions and converter melting is decidedly unfavorable.

Gas Absorption Affects Quality

The methods of melting best calculated to allow the breaking point of the emulsion give the cleanest and highest quality steel. While gas absorption also affects the quality, there is a definite relation between deemulsified and high-quality steel. It is, therefore, pertinent to inquire whether there may not be methods of breaking up the emulsion other than just letting it set. While many of the inclusions in steel are so large that the emulsified suspended particles of dirt are well above the critical dimensions of those in an aqueous colloidal emulsion or suspension, the mechanism of the retention of the dirt in suspension seems closely analagous to that of aqueous colloidal solutions. Hence the colloid chemist should be able to suggest other lines of attacking the problem. Prof. W. D. Bancroft, Cornell university, says:

"The problem of eliminating sonims probably is essentially one in colloid chemistry, the cast metal containing sonims constituting a frozen colloidal solution. We probably are dealing with a case of emulsification of the slag and sulphides by the metal. The reverse case is well known. In the electrolysis of fused caustic soda to metallic sodium, at a slightly too high temperature, we get an emulsion of sodium in fused caustic as a metal fog.

"It might be possible to clean the metal from sonims by introducing more sonims of larger size, because of the greater tendency to agglomeration. One can take a dilute suspension of kaolin in water, from which only the coarser particles will settle in reasonable time; a more concentrated suspension will settle clear because there are more coarse particles, which hit and carry with them the finer ones. If the particles are less dense than the medium they rise rather than sink, but the principle is the same. Cream rises faster and more completely in a deep narrow vessel than in a wide shallow one.

"There is also the possibility of adsorbing the sonims into other materials. A suspension of carbon black can be filtered through filter paper even though the pores of the filter are larger than the particles of black, because the black is adsorbed by or sticks to the cellulose of the filter paper. Wool will adsorb alumina completely from a dilute suspension in water. We are not able to predict what substances would strongly adsorb sulphides or slag particles and also have no deleterious effect on steel; but it is quite possible that there are such substances.

"The cleansing action of titanium and vanadium in steel is thought to have a specific coagulating effect on the sonims, enlarging them above the critical size so they will rise. Others say their oxidation products form inclusions above the critical size so they will rise. Increasing coalescence by making the sonims more fusible, that is, fluxing them, is a possibility. Stirring, as by the pinch effect of an induction furnace, might aid coalescence.

"The question of after treatment with special slags should be considered. The slags in use were chosen, primarily, on chemical considerations and it does not follow that they are the best for removing sonims. If acid open-hearth steel is cleaner than basic, the difference in the slag gives a lead worth following.

"We have a fairly satisfactory theory for aqueous colloidal solutions but know little, as yet, about nonaqueous colloidal solutions, and it will be necessary to develop the theory as we go along. This does not mean that the problem of removing sonims is insoluble; there are definite and promising lines of attack. It is not a vague problem where we have to try things blindly, but a legitimate scientific and technical problem in which there is every reason to expect that real progress can be made. It is not, however, an overnight job; it is a long difficult task that must not be handled in a desultory or intermittent fashion."

Professor Bancroft thus encourages us to believe that systematic attack on dirty steels along the line of studying the fundamentals of colloid chemistry applied to molten metals might bring results in time. Much information is needed on which small scale laboratory tests would be of value, for while any modified or new methods must ultimately be tested on a large scale, the basic facts can be studied best on a small scale.

The evils of dirty steel are appreciated greatly by aircraft and automobile engineers, who have the problem of excess weight to contend with. The demand for clean dependable steel, however, will spread beyond these fields. A quality product always extends its field. Mathews calls the electric steel rail "still a desired possibility." Even the relatively clean steel of the electric furnace is too expensive for large tonnage uses. While the electric furnace would probably prove a desirable adjunct in the production of clean steel, even were other methods developed for removing the dirt, other methods might be found that would apply to open-hearth melting; in that case open-hearth steel might have the quality of present electric steel and the quality of electric steel might be greatly improved.

Doubtless there are various paths leading to clean steel. Only one of these, a final quiet period in electric or crucible furnaces, so far is in use; but the method is not infallible. Until a systematic study is made of the methods that the colloid chemist can suggest, we have only scratched the surface of the possibilities. No stone should be left unturned in the effort to produce clean dependable steel for use where safety to life or limb is involved and where requirements of lightness make it desirable to use a low factor of safety.

The bureau of mines considers this problem of great importance and one which should receive attention. With Professor Bancroft's aid, a fairly definite program of what to try first and how to go ahead has been planned, and as a problem in process metallurgy it falls in the legitimate field of the bureau. But, inasmuch as the funds are alloted for definite purposes, it is at present impossible to attack the problem experimentally except in a desultory and intermittent fashion, which would be a waste of time. The next best thing seems to be to discuss the problem, as has been done here, so as to convince the users and producers of steel, and nonferrous alloys as well, that dirty metal is unreliable, often dangerous. Dirty metal is an emulsion; relatively clean metal is produced by one method of breaking up an emulsion; other methods are possible, which might be cheaper or more efficacious. To find such methods we should build on the present knowledge of aqueous colloids and develop fundamental knowledge of colloids in molten metals.

Lifts Furnace Top

(*Concluded from page* 1819)

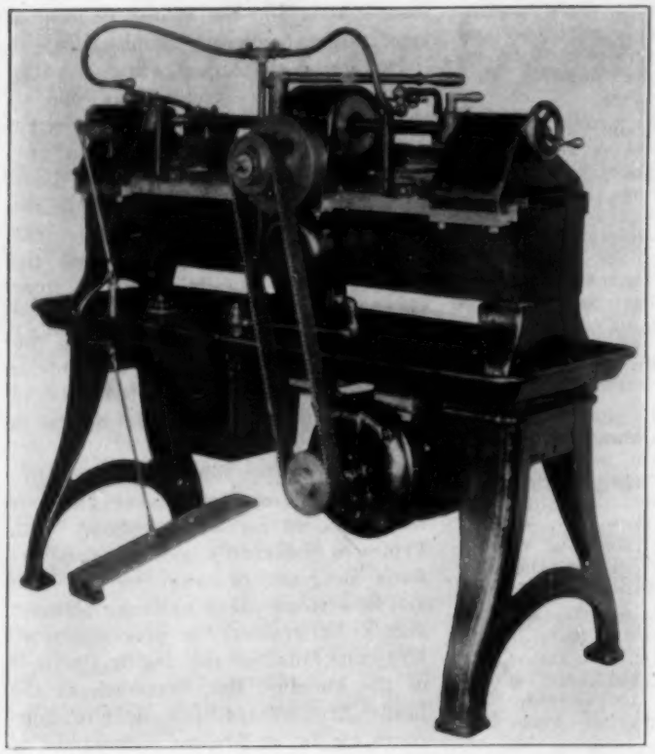
tic clay should be used in the manufacture.

2. The bricks should be burned to at least cone 12 (2498 degrees Fahr.) and preferably to cone 14 (2570 degrees Fahr.)

3. The brick should analyze 52 to 55 per cent SiO_2; 39 to 42 per cent Al_2O_3; iron not more than 3 per cent; TiO_2 about 1 per cent although this is unimportant; and CaO, MgO, K_2O and Na_2O not more than 2 per cent in the aggregate. The sum of the molecular equivalents in terms of Al_2O_3, FeO, CaO, MgO, K_2O and Na_2O should not exceed 0.220.

4. Twenty bricks, selected at random, from the lining, should pass the compression test of 50 numbers per square inch at 2462 degrees Fahr.

The work, help, and valuable suggestions of A. H. Fosdick and O. R. Rice



CENTER DRIVE LATHE HAVING SINGLE LEVER CONTROL

of the blast furnace department, and the work of A. D. Shankland, who supervised all the chemical analyses are acknowledged by the author.

Compares Statistics on Babbitt Metal

Value of the products of makers of babbitt metal and solder in 1921 aggregated $26,255,000, compared with $59,017,000 in 1919 and $19,180,000 in 1916, the census bureau, Washington, states. Raw material used cost $22,355,000 in 1921, $48,844,000 in 1919 and $15,652,000 in 1916. Salaries and wages paid aggregated $3,476,000 in 1921, $5,053,000 in 1919 and $1,614,000 in 1916. The number of persons engaged in the industry was 2089 in 1921, 3372 in 1919 and 1686 in 1916. The number of establishments was 98 in 1921, 111 in 1919 and 95 in 1916.

Center Drive Lathe Turns Ends of Axle Shafts

For turning the ends of axle shafts, camshafts and similar parts which permit the turning of both ends simultaneously, the Porter-Cable Machine Co., Syracuse, N. Y. has introduced a center drive lathe. A rear view is shown in the accompanying illustration. The entire control of the machine is accomplished by means of one lever which operates the clutch mounted on the headstock. The drive is by means of a 3-horsepower motor fastened to the under side of the pan and connected to the driveshaft by sprockets and chain.

The spindle is 2¼ inches long with a 2⅛-inch hole through the center and is mounted on large ball bearings and driven by hardened spiral gears running in oil. The feed is from the drive shaft to the worm shaft in the bed by means of pick off gears. A cam constitutes the worm gear drive which feeds the carriages and returns them to the starting point. The pump is driven from the worm shaft so that the pump does not work when the spindle is stopped.

The tailstock on the left of the operator is operated by a handwheel while the one on the right is foot operated. This arrangement leaves the right hand of the operator free to remove the work. The machine can be furnished with belt drive if desired. The two carriages work simultaneously, the machine taking 32 inches between centers. The weight of the machine is only 1500 pounds. However, it is claimed the rigid construction allows heavy cuts to be taken.

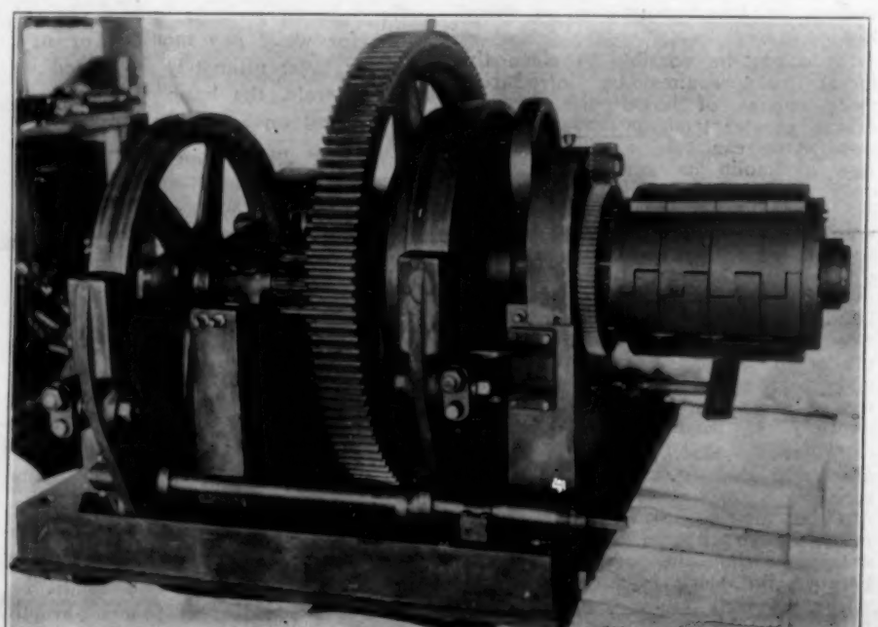
Introduces New Rolling Mill Coiler

A new type of rolling mill coiler for use particularly on cold finishing mills where high tension coiling is of great importance in producing a fine finished product, has been introduced recently by the Duston & Clark Engineering Co., 8410 Lake avenue, Cleveland. A view of the new device is shown in the accompanying illustration.

The mechanism is quick acting in operation and automatically adjustable as to speed. The power may be supplied in three ways, namely, by silent chain drive from the mill motor, by independent motor, or by belt drive from the lineshaft. The speed of the drive pinion is constant and is set to operate the drive shaft gear at the speed of the mill.

The winding drum is mounted on an extra large shaft, running in an adjustable bearing. A compensating governor is mounted on the opposite side of the gear. The governor is in the form of a flywheel fitted with a friction brake on the outside rim. Between the drum on one side and the governor on the other the shaft gear operates in a balanced relationship similar to a planetary gear transmission.

The census bureau, Washington, places the value of sand and emery cloth and paper manufactured in the United States in 1921 as $6,462,000. In 1919 it was $9,304,000 and in 1914, $4,328,000. The cost of raw materials used was $3,692,000 in 1921, $5,061,000 in 1919 and $2,687,000 in 1914. In all three years 12 plants were engaged in this line of manufacture, with 983 employes in 1921, 1102 in 1919 and 833 in 1914



ROLLING MILL COILER HAVING AUTOMATIC SPEED ADJUSTMENTS

May Coke Output Shows a Slight Increase

Washington, June 18.—The output of by-product coke in May was 3,328,000 net tons, an increase of 122,000 tons or 3.8 per cent over the April output. This gain was partly due to the greater number of working days and partly to an increase in the average daily rate of production, according to the geological survey. The quantity of coke produced was 89.2 per cent of the capacity of plants in existence. The total count of plants is now 69, two formerly reported separately having been consolidated. Of these, 63 were active and six idle.

The production of beehive coke also increased in May. The output was 1,829,000 net tons as compared with 1,776,000 tons in April. Thus the total output of all coke was 5,157,000 tons, of which by-product coke constituted 64.5 per cent and beehive coke 35.5 per cent. The monthly production of coke is shown in the following table:

	By-product coke	Beehive coke	Total
1917 monthly average	1,870,000	2,764,000	4,634,000
1918 monthly average	2,166,000	2,540,000	4,706,000
1919 monthly average	2,095,000	1,638,000	3,733,000
1920 monthly average	2,565,000	1,748,000	4,313,000
1921 monthly average	1,646,000	462,000	2,108,000
1922 monthly average	2,374,000	669,000	3,043,000
March, 1923	3,256,000	1,749,000	5,005,000
April, 1923	3,206,000	1,776,000	4,982,000
May, 1923	3,328,000	1,829,000	5,157,000

(a) Excludes screenings and breeze.

Production of beehive coke in the week ended June 9 was restored to the pre-Memorial day rate. On the basis of the number of cars loaded on the principal coke carrying railroads, the total output is estimated at 416,000 net tons. The recovery is shown principally in the figures for the Pennsylvania-Ohio and West Virginia districts. Estimated weekly output of beehive coke follows:

	Week ended June 9, 1923(a)	Week ended June 2, 1923(b)	Week ended June 10, 1922
Pennsylvania and Ohio	341,000	323,000	68,000
West Virginia	22,000	20,000	7,000
Alabama, Kentucky, Tennessee and Georgia	23,000	24,000	10,000
Virginia	15,000	14,000	6,000
Colorado and New Mexico	9,000	8,000	5,000
Washington and Utah	6,000	6,000	3,000
United States total	416,000	395,000	99,000
Daily average	69,000	66,000	17,000

(a) Subject to revision. (b) Revised from last report.

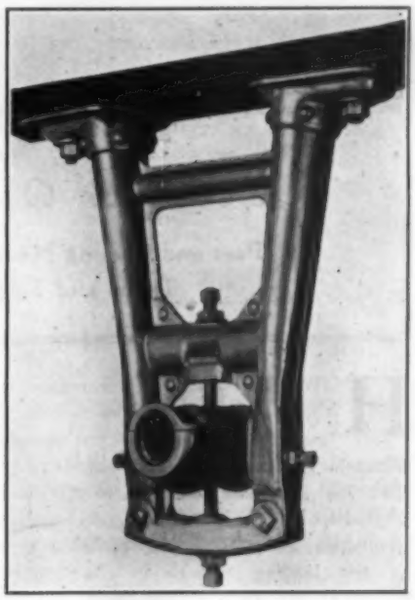
Production of butuminous coal in May was 46,076,000 tons. This compares with 42,700,000 tons in April, and 20,601,000 tons in May, 1922. Weekly output is running around 10,800,000 tons.

The Standard Machinery Exchange, a company dealing in new and used machinery, has opened an office and display floor at 1613 St. Clair avenue, Cleveland. L. B. Marsh, formerly associated with the Marsh Motor Corp., is manager.

Designs Pressed Steel Shafting Hanger

A pressed steel shafting hanger of new design recently has been introduced by the American Pulley Co., Philadelphia. The hanger, as shown in the accompanying illustration, is made entirely of pressed steel, and is of the four set screw type. The hanger is also of the parting type, in other words it has a swing yoke which readily permits the removal of shaft or bearing.

The main frame of the hanger is constructed of two stampings placed face



SHAFTING HANGER HAVING A FRAME CONSTRUCTED OF TWO STEEL STAMPINGS

to face, with inturned flanges extending the entire length of the leg. These inturned flanges are used to provide strength and rigidity. The cross brace is integral with the legs. All bolts, nuts and set screws are of standard dimensions. The four bearing nuts on the set screws which support the shaft load are flush with the inside edge of the shaft opening, providing a minimum amount of overhang for the set screws. The foot of the hanger is made of cold-drawn seamless steel. Attachment of the foot to the oval frame leg is through the seamless flange on the foot and is by means of heavy rivets. The hanger is made in regular drops, 7 to 24 inches and is made for all shaft sizes up to 3 inches.

Detroit, June 19.—The Excello Tool & Mfg. Co., 1214 Beaubien street, makers of high speed grinding spindles, has taken a long time lease on the second floor of the building at East Grand boulevard and Helen avenue, giving them 18,000 square feet of floor space.

Freight Loadings and Car Surplus Increase

Washington, June 19.—In spite of freight loadings topping 1,000,000 cars a week the freight car surplus of the railroads continues to grow. In the June 1-7 period the daily average surplus of freight cars over all requisitions was 28,128, compared with 16,166 in the May 23-31 period and 2115 in the May 15-23 period. Prior to that, the demand exceeded the supply of cars. The demand for coal cars continues slightly greater than the supply, but a surplus of box cars is piling up.

Loading continues at a record rate. In the week ended June 2 the railroads loaded 932,041 cars of freight, compared with 1,014,029 in the preceding week. The week ended June 2, included the Memorial day holiday, but the rate per day was equal to a full weekly rate of more than 1,100,000 cars. Despite the Memorial day holiday, the loading of ore increased 3000 cars, to 73,390 for the week.

While the railroads are progressively more able to handle heavier loading, still the increased equipment is a large factor. From Jan. 1 to June 1 the railroads had installed 61,809 new freight cars and 1697 new locomotives, while on June 1 they had on order 98,421 freight cars and 2041 locomotives.

In anticipation of the crop movement, the railroads are dispatching much box-car equipment west. From April 16 to June 8 the carriers had delivered more than 41,000 box cars to the western roads at St. Louis and Chicago. Freight cars in need of repair on June 1 numbered 211,766 or 9.4 per cent of the number on line, an increase of 1523 from May 15.

In April the railroads rolled up the greatest daily average movement per freight car since 1920, states the bureau of railway economics. The April average was 28 miles per car per day, or two miles below the mark being aimed at. Every increase of one mile per car per day is equivalent to adding 100,000 freight cars to the railroads' equipment. The increase in car efficiency in April over March, therefore, was equal to putting into service 100,000 more freight cars.

A bill affecting the issuance of injunctions in labor disputes in Wisconsin which was fostered by the state federation of labor has become a law with the signature of the governor. Court commissioners may no longer issue injunctions or restraining orders, and when applications are made to circuit courts, 48 hours' notice must be given before a writ can be issued.

Stock Issued for Sale to Employes

Pittsburgh, Pa., June 19.—The Westinghouse Electric & Mfg. Co.'s employes may now participate in the purchase of a new issue of 20,000 shares of common stock at $53 a share. The par value is $50. Each employe may subscribe for one to 20 shares of stock and pay for it in 10 consecutive monthly installments. No interest will be charged on deferred payments. When the final payment on each stock subscription becomes due, dividends at the rate declared and paid on the company's common stock after Aug. 1, 1923, when the plan goes into effect, will be credited to the account of each subscriber.

This plan will not interfere with the insurance saving fund now in force. In the latter plan the employe, by depositing 2 per cent of his salary in a 4½ per cent interest-bearing savings fund, obtains additional insurance up to $1500 over the $500 given by the company after six months' service.

Commenting on the stock issue, E. M. Herr, president, said: "We are explaining to the employes that common stock of the company, like all common stock, is necessarily subject in its value to the fluctuating conditions of business. The company is glad to have its employes become stockholders, but it is clearly understood that their participation in the ownership of the stock is a wholly voluntary act on their part."

Bill Passed To Attack Pittsburgh Plus

Chicago, June 19.—A bill has been passed in the Illinois legislature and awaits the signature of the governor, providing for the appointment of a commission to take legal action to stop the practice of selling steel on a Pittsburgh basis. The commission is to be composed of two state senators and two representatives of opposite political parties, a member of the American Farm Bureau Federation and of the Western Association of Rolled Steel Consumers. The legislation was fostered by representatives of the association of rolled steel consumers.

Elect New Directors

The Penn Seaboard Steel Corp. Philadelphia, at its last stockholder's meeting elected four more department heads to become members of the board of directors. This action was in harmony with the company's policy of tying up the determination of policies more closely with the men who execute them. The four new members of the board are: H. A. Baxter, general manager of sales of the Tacony Steel Co., subsidiary of the Penn Seaboard Steel Corp.; G. A. Pedrick, director of purchases of the Penn Seaboard Steel Corp., A. M. Andorn, comptroller of the Penn Seaboard Steel Corp., and R. W. Smith, assistant manager of sales of the Tacony Steel Co. Other executives of the company who are on the directorate are: B. Warren, president; C. F. Jamison, vice president and treasurer, and M. S. Hagar, secretary.

Completes New Plant

The Pneulec Machine Co., Ltd., Smethwick near Birmingham, England, manufacturer of molding machines and foundry equipment, has just completed an entirely new plant located in Mafeking Road, Smethwick. The new plant includes a completely equipped machine shop and ample facilities for the manufacture of foundry supplies and equipment of all sorts including core oils.

May Cement Output Gains

Washington, June 19.—Portland cement production in the United States in May totaled 12,910,000 barrels, compared with 11,359,000 in April and 11,176,000 in May a year ago, the geological survey states. Shipments in May amounted to 14,257,000 barrels, against 12,954,000 in April and 12,749,000 in last May. At the close of May, stocks on hand totaled 10,115,000 barrels, compared with 11,463,000 at the close of April.

Petition for a receiver for the General Plating Co., 1035 Winnebago street, Milwaukee, has been filed by Frederic B. Stevens, Inc., Detroit, on the ground that a civil judgment for $139.72 has been returned unsatisfied.

News of Societies

Past and Coming Meetings of National and Local Trade and Technical Organizations

HOWARD EVANS, secretary of the Philadelphia Foundrymen's association, was tendered a complimentary dinner by the members of that body at the Manufacturers club, Philadelphia, June 13. Those present numbered about 140 and included most of the leading figures in the foundry industry in the Philadelphia district. Howard Evans 32 years ago was elected secretary of the Philadelphia Foundrymen's association when that body was organized and has been re-elected to this office each year since. During that time he has been a leading spirit in that body which generally is regarded as one of the most successful local foundrymen's associations in the country. In addition to his work as secretary of the Philadelphia Foundrymen's association, Mr. Evans has performed numerous services for the foundry industry of the country. Among the features of the testimonial dinner was the presentation by William J. Johnson, superintendent of foundries for the Baldwin Locomotive Works at Eddystone, Pa., of a gold watch on behalf of the members of the association. Frederick M. Devlin, president of the association, who presided over the dinner, recounted the various services Mr. Evans had rendered the association and the foundry industry. He expressed his appreciation of Mr. Evans' splendid qualities and tendered the thanks of the association with the fervent wish that Mr. Evans would continue to serve in his capacity as secretary for many years to come.

Foundrymen Hold Picnic

One hundred members of the New England Foundrymen's association attended the outing at Lake Quinsigamond, Worcester, Mass., June 13, with Worcester members as hosts. They met at the plant of the Arcade Malleable Iron Co., at 1 p. m., and after inspecting the foundry and other nearby casting plants, motored to the lake where lunch was provided and the afternoon devoted to sports, including a ball game. At night there was a chicken barbecue, followed by an address on "Salesmen, Past and Present," by Pat Dwyer of *The Foundry*, Cleveland.

Convention Calendar

June 20-23—American Institute of Chemical Engineers. Summer meeting at Wilmington, Del. J. C. Olson, Polytechnic institute, Brooklyn, N. Y., is secretary.

June 25-29—American Society for Testing Materials, annual meeting at the Chalfonte-Haddon hall hotel, Atlantic City, N. J. C. L. Warwick, 1315 Spruce street, Philadelphia, is secretary.

June 25-29—American Institute of Electrical Engineers. Annual convention at Swampscott, Mass. F. L. Hutchinson, 33 West Thirty-ninth street, New York, is secretary.

Sept. 24-28—American Association of Iron and Steel Electrical Engineers. Convention and exhibition, Auditorium, Buffalo. Headquarters of the association are located at 1007 Empire building, Pittsburgh.

April Steel Imports Show Drop

Decline of 36,073 Tons of Pig Iron Received Accountable Largely for Difference Between Total of 106,050 Gross Tons in March and 77,794 Gross Tons in April—Iron Ore Imports Continue to Increase

APRIL imports of iron and steel totaled 77,794 gross tons, a drop of 36,073 tons from the 106,050 ton total for March, according to figures issued by the bureau of foreign and domestic commerce, department of commerce. The April decline is due largely to the falling off in pig iron imports, the total of this material received in the United States dropping from 72,344 tons in March to 36,271 tons in April.

PIG IRON IMPORTS

Gross Tons

From:	April, 1923
France	6,789
Germany	1,369
England	21,224
Scotland	250
Quebec and Ontario	1,514
British Columbia and Yukon	25
Cuba	4,100
British India	1,000
China	100
Total	36,271

IRON ORE IMPORTS

Gross Tons

From:	April 1923	April 1922	Four months ending April 1923	Four months ending April 1922
Spain	.....	.....	41,049	10,157
Sweden	63,669	.....	184,768	7,458
Canada	224	.....	379	512
Cuba	38,800	.....	212,139	21,050
Other countries	68,766	2,710	248,984	4,996
Total	171,459	2,710	687,319	44,173

Total imports of iron and steel for the first four months of 1923 amount to 371,482 gross tons, as compared with 57,671 tons for the corresponding period of 1922. Of this total, pig iron takes the major part with an aggregate of 228,343 gross tons for the four months ending with April, 1923.

IRON AND STEEL IMPORTS

Gross Tons

	April 1923	April 1922	Four months ending April 1923	Four months ending April 1922
Pig iron	36,271	5,968	228,343	16,073
Ferromanganese	6,053	2,380	26,094	8,540
Ferrosilicon	1,169	456	4,515	2,670
Scrap iron and steel	22,755	4,430	78,439	11,939
Bar iron	1,238	203	2,112	1,083
Steel ingots, bars, etc.	1,263	1,411	6,511	7,229
Structural shapes	1,291	160	2,524	716
Rails and splice bars	2,918	3,149	7,333	6,810
Boiler and other plates	3	....	364	110
Sheets and saw plates	105	11	466	
Tin plate	3,268	144	8,711	1,933
Wire rods	29	69	1,455	568
Total	76,365	18,381	366,867	57,671

OTHER IMPORTS

Tubular products	528	*	1,681	*
Round iron and steel wire	315	*	1,455	*
Castings and forgings	302	*	668	*
Nails and screws	118	*	379	*
Bolts, nuts, rivets, etc.	17	*	71	*
Flat wire and strip steel	149	*	361	*
Grand total	77,794	18,381	371,482	57,671

*Due to change in classification comparisons are not possible.

Scrap iron received, registered another gain, the April total being 22,755 tons as compared with 20,047 tons for March, and 4430 tons for April, 1922.

Tin plate also shows a gain for April, with 3268 tons being imported in that month, as compared with 425 tons for the preceding month, and 144 tons for April, 1922. Rails and structural shapes registered gains, the former increasing from 838 tons in March to 2918 tons in April, and the latter from 532 tons in March to 1291 tons in April.

Iron ore received in April totaled 171,459 tons, a gain over the total of 166,626 tons for March and the 103,702 tons total of February. For the first four months of 1923, there was imported a total of 687,319 tons of iron ore, as compared with that of 44,173 tons for the same period of 1922.

FERROMANGANESE AND MANGANESE ORE IMPORTS

Gross Tons

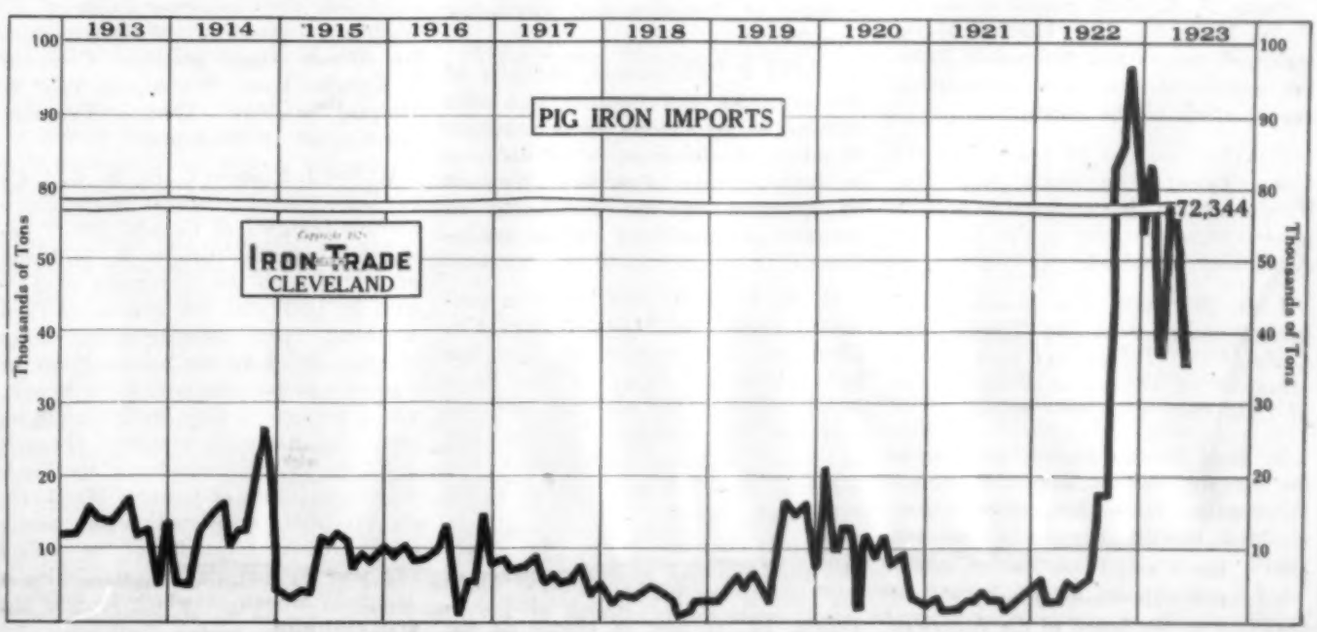
Manganese ore from:	April, 1923
Germany	6
Turkey-in-Europe	3,170
England	3
Brazil	10,892
Total	14,071

Ferromanganese from:	April, 1923
Sweden	4
England	6,049
Total	6,053

IMPORTS OF VARIOUS IRONS AND FERROALLOYS

Gross Tons

	April 1923	April 1922	Four months ending April 1923	Four months ending April 1922
Ferromanganese	6,053	2,380	26,094	8,540
Ferrosilicon	1,169	456	4,515	2,670
Manganese ore	14,071	25,559	32,335	57,383
Tungsten bearing ore	.....	.....	.....	.....
Nickel ore	648	.....	1,713	.....



Men of Industry

Personal News of a Business Character Pertaining to the Iron and Steel and Related Fields

ADRIAN P. SLOAN, chairman of the board of directors and treasurer of the Cushman Chuck Co., Hartford, Conn., has been elected president of that company, succeeding Richard Cushman, resigned, who sailed June 12 for a European trip. Mr. Sloan will retain his present offices in addition to the new. He has been with the company about 45 years. Harry E. Sloan, vice president, becomes vice president and manager, and Fred H. Dean continues as secretary.

Edwin W. Smith, assistant treasurer of the H. B. Smith Co., Westfield, Mass., has been elected president of the Massachusetts State Chamber of Commerce.

William J. Curley, for more than 16 years night superintendent of the North Works of the American Steel & Wire Co., Worcester, Mass., will retire on a pension July 1.

J. M. Watson, director of the metallurgical department of the Hupp Motor Co., has been elected chairman of the Detroit chapter, American Society for Steel Treating.

C. W. Prichard, president of C. W. Prichard & Co., Inc., New York, dealer in used and rebuilt machinery, has returned from a vacation in Canada.

Philip S. Kimball, president of the F. W. Mann Co., Inc., Milford, Mass., maker of cutters and automobile jacks, has purchased the entire outstanding capital stock of the company.

Eric Johnson, for 12 years with the Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., has resigned to become general superintendent of the Kaufman Arms Co., Cleveland.

J. B. Nordholt, vice president and general manager of the Toledo Steel Castings Co., Toledo, has been elected president of the national oganization of Ohio State university alumni.

E. Kent Swift, treasurer and manager of the Whitin Machine Works, Whitinsville, Mass., has returned from a three months trip to China and Japan.

Edwin W. Harrison, recently elected chairman of the board of the American Tube & Stamping Co., Bridgeport, Conn., was formerly president of the Superior Steel Co., Pittsburgh.

Elmer Griffiths, assistant superintendent of the New Philadelphia plant of the American Sheet & Tin Plate Co. for the past 12 years, has resigned to become superintendent of a new mill at Wyandotte, Mich., which is being built by the Michigan Steel Corp. His resignation becomes effective June 15.

J. W. Hemmerle has become identified with the machine tool and crane sales department of the McCoy-Brandt Machinery Co., Pittsburgh. He formerly was affiliated in a similar capacity with the L. A. Green Rail & Machinery Co., First National Bank building, that city.

William E. Holler, former manager of the chamber of commerce, Flint, Mich., has been named general manager of the Durant and Star automobile interests in that city, which plans to begin operation about July 1. Holler recently has been assistant to W. C. Durant in New York.

E. R. Jackson who recently joined the organization of Milton Pay Co., manufacturers' representatives in Seattle, San Francisco and Los Angeles, was formerly connected with the Smith-Booth-Usher Co., Los Angeles, as manager of the stock and purchasing departments.

Charles F. Whittemore, physicist of Denver, Colo., and from 1913 to 1916 attached to the radium division, bureau of mines, Washington, is on his way to Buenos Aires, Argentina. He will be occupied in the installation of apparatus for purifying radium emanation.

H. M. Leathers, who has been connected with the Dingle-Clark Co., Cleveland, for a number of years, has been placed in charge of the Pittsburgh office of the company and will represent the company in the sale of steam turbines, transformers and industral electrical construction in the Pittsburgh district.

Harold Hemenway, for five years vice president and general manager of the Peoria Malleable Castings Co., Peoria, Ill., is now in charge of the Beloit, Wis., works of the Wanner Malleable Iron Co., Hammond, Ind., which recently purchased the foundry group of the Stewart-Warner Mfg. Co.

Joseph Leonard, prominent Belgian foundryman, has resigned his position with the Fabrique Nationale, Herstal, Belgium, to become director of the Etablissement Demoulin, a prominent engineering works at Farciennes near Charleroi. Dr. Leonard is president of the Association Technique de Fonderie of Belgium which has its headquarters at Liege.

C. L. Fortescue has been named manager of the newly formed porcelain insulator and transmission engineering department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He entered the employ of the Westinghouse company in 1898 after his graduation from Queen's university, Kingston, Ont., and during the latter 20 years of that time has been engaged in work on insulation and transmission.

Dr. Ira N. Hollis, past president of the American Society of Mechanical Engineers, is to retire as president of Worcester Polytechnic institute, Worcester, Mass., upon the appointment of his successor. A committee has been appointed to select his successor composed of the following: Charles G. Washburn, president, Washburn Co., Dr. Homer Gage, president Crompton & Knowles Loom Works and Paul B. Morgan, president, Morgan Construction Co., all of Worcester.

Walter J. Francis, C. E., M. E. I. C., has been elected president of the Engineering Institute of Canada. Mr. Francis was born in Toronto in 1872 and graduated from the University of Toronto in 1893 with the degree of Civil Engineer. After engaging in many lines of engineering on his own account he formed a partnership with F. B. Brown, which business is now being carried on under the name of Walter J. Francis & Co. As an active member of the Engineering Institute of Canada, Mr. Francis has been associated with nearly every prominent activity of the society and was instrumental in establishing a Montreal branch of which he was the first chairman.

Volume Refreshes Memory of James H. Hoyt

By John A. Penton

THE life and work of James H. Hoyt who was born in Cleveland in 1850, passed his eminent career in that city and died in 1917, are brought back most vividly to those who were his friends or knew him, by the pages of the volume dedicated to his memory and prepared by his son, Elton Hoyt, 2d.

Instead of presenting his subject in a conventional, biographical way, Mr. Hoyt has given a series of speeches, papers and verses of his father's authorship, gathered with care and appreciative choice from every available source and has put them together in an original and delightful manner. A limited edition of the book is being distributed to his father's personal friends and admirers.

While an inspiring reminder of the spirit of a wonderful personality that was once James H. Hoyt, these expressions of his life's interests chiefly call to memory the polished and accomplished gentleman who never spared himself when the chance came to help others and whose marked courtesy and thoughtfulness to all whom he met ever left an indelible impression.

While his masterful skill as a legal adviser was recognized, his eminence in his profession universally acknowledged, his charming power as an orator appreciated, and all those accomplishments that came to him through study, travel and education, and great ability conceded, yet these were all secondary to the possession of a disposition that only and always reflected the true heart within.

We are again reminded of the loss that his death means to his friends and especially that large and important iron and steel and marine clientele that he so well served in life.

The volume begins with the valedictory address delivered by Mr. Hoyt upon his graduation from Brown university. Then follow noted selections and extracts from historical, political and professional addresses, from memorial orations, from toasts and after dinner speeches and a collection of other miscellaneous writings.

Ore Road Earns Heavily

The Duluth, Mesaba & Northern railroad, a subsidiary of the United States Steel Corp., which operates between the iron ore mines and upper lake ports, reports net income for 1922 of $6,072,300. This is equivalent to $147,650 a share on the outstanding stock. Earnings for the previous year were equivalent to $66.78 a share. This road is credited with earning more for each share of stock in 1922 than any other railroad in the United States.

Steel Foundries to Buy Damascus Brake Beam

The Damascus Brake Beam Co., Cleveland, is soon to pass under the control of the American Steel Foundries, Chicago, according to present plans. Negotiations have been practically completed. Terms of the merger are said to provide for the exchange of one share of Damascus stock for 1½ shares of American Steel Foundries preferred. The Damascus Brake Beam Co. is capitalized with $500,000 common stock of $100 par value while the capitalization of the American Steel Foundries consists of 24,073,200 common and $8,381,300 of 7 per cent cumulative preferred outstanding.

Officers of the Damascus Brake Beam Co. include: C. D. Jenks, president; K. F. Gill, vice president; and A. E. Adamson, secretary. S. Livingstone Mather is a member of the board of directors.

Steel & Tube Earns More

Net profits of the Steel & Tube Co. of America for the first three months of 1923, amounted to $2,207,415. Earnings available for the common dividend, after allowance of $294,742 for the preferred stock, amount to $1,912,673, or about $1.97 a share. Net profit for all of 1922 was only $472,420, or about $706,500 short of covering the preferred dividend requirements for the year.

American Shows Profit

The American Rolling Mill Co., Middletown, O., reports net profits for the three months ended March 31, 1923, of $776,168, before interest and taxes, but after allowing $282,260 for depreciation and reserves. Sales amounted to $6,536,973.

Otis Steel Net Gains

Net profits of the Otis Steel Co., Cleveland, for the three months ended March 31, 1923, before depreciation, were $248,958. This compared with a deficit of $365,188 for the first three months of 1922.

The United States Cartridge Co., Lowell, Mass., has given its 900 employes a 10 per cent wage increase effective July 1.

Prices Decline

On Ball And Flake Naphthalene—Remained Of Market Steady

New York, June 19.—With the cleaning season nearing a close, prices on ball and flake naphthalene have declined a half point. Balls are holding at 10½ cents, works, and flakes at 9½ cents. A scarcity is still noted in flakes, however, as warm weather is making the production difficult.

The remainder of the coal tar by-products list, however, is steady. Sulphate of ammonia, which recently has been manifesting an easier tendency, continues to hold $3.10 to $3.15 works, on spot shipments for domestic account, and $3.45 to $3.50, port in double bags, on foreign account. Light oil distillates, such as benzol, toluol and solvent naphtha, are in fairly easy supply, but here also quotations are unchanged.

Pure benzol may be quoted at 27 cents works in tanks and 32 cents in drums; 90 per cent benzol, 25 cents in tanks, and 30 cents in drums; toluol, 30 cents in tanks and 35 cents in drums; solvent naphtha, 27 cents in tanks and 32 cents in drums; and commerical xylol, 29 cents in tanks and 34 cents in drums.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants in Tank Lots

Pure benzol	$0.27
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.24
Naphtthalene flake	0.9 ½
Naphthalene balls	0.10½

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	$3.10 to $3.15

Contract

Pure benzol	$0.27
Toluol	0.30
Solvent naphtha	0.27
Commercial xylol	0.29

Per Pound at Producers' Plants

Phenol	$0.24
Naphthalene balls	0.10½
Naphtthalene flake	0.9 ½

Radium Use Expanding

Washington, June 19—Expansion of American manufacturing opportunity in South America is reported by the American Chemical society. This expansion is reflected in the growth of the demand for American made radium machinery, an envoy of this field of science being now on his way from the United States, to Buenos Aires, Argentina Charles F. Whittemore, Denver, Colo., being selected.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

ANNOUNCEMENT has been made of the starting of the first unit of the Buffalo plant of the Niagara Falls Smelting & Refining Corp. The plant is producing brass and bronze ingots and special alloys. Ernest G. Jarvis, vice president and general manager of the company, for the last six years, has been chief chemist and metallurgist superintendent of foundries and rolling mills for the McNab & Harlin Mfg. Co., Paterson, N. J. Other officers are as follows: President W. R. Hopkins, Cleveland; secretary, Arthur Maddigan, Buffalo; Treasurer, Howard O. Babcock, Niagara Falls, N. Y.

* * *

THE FEILBACH MFG. CO., Maryville, Wis., has purchased and equipped a plant and is engaging in the production of valve lifting tools for various types of automobiles. Plans are being made for the manufacture of an air compressor in the near future. John A. Thiel is secretary of the company.

* * *

POWER for Bethlehem, Pa., and vicinity in the future will be furnished from one central power plant, according to a recent announcement. This plan will mean the demolition of a power plant located on Ninth street near the Lehigh bridge. Building of a $200,000 transformer station will be necessary under this plan.

* * * *

CONSTRUCTION of an addition to the H. B. Smith Co., Westfield, Mass., has been started and when completed additional room will be provided for the employment of 200 additional men. At the present time 1400 are employed, the largest in the history of the company. The new building will be 100 x 150 feet.

* * * *

OFFICERS of the Kelley Island Lime & Transport Co., were re-elected at the annual meeting June 13 as follows: John A. Kling, chairman; George R. Johnson, president; E. W. Oglebay, F. A. Beckwith, G. J. Whelan, F. W. Ohlemacher, vice presidents; C. A. McMorris, secretary-treasurer; A. B. Mack, assistant general manager; F. W. Kuhl, assistant secretary and assistant treasurer. Mr. Whelan also was re-elected general manager.

The executive committee will consist of John A. Kling, George R. Johnson, H. M. Hanna, Jr., John Sherwin, John E. Morley and W. B. Sanders. Members of this committee with H. G. Dalton, W. G. Mather, F. A. Beckwith, E. W. Oglebay, A. Y. Gowen, C. R. Morley and G. J. Whelan compose the directorate.

* * *

THE STOUGHTON WAGON CO., Stoughton, Wis., which is devoting its work almost entirely to the manufacture of bodies and cabs for delivery cars and motor trucks, is starting work on a one-story addition, 90 x 300 feet, to the present three-story body shop. The company also has equipped a leased building at Janesville, Wis., for body production. Due to a transposition of lines, an item in June 7 issue of IRON TRADE REVIEW was made to read that this company had changed its name to Lederman System, Inc. Then it was the Filedex Corp., Green Bay, Wis., which was referred to.

* * *

INCORPORATION of the Canton Metal Products Co., Canton, O., is announced. The corporation has $200,000 in preferred stock, and 4000 shares of common stock at no par value will also be issued. It will engage in the manufacture of general metal products, mostly for the automotive industry, according to Harry Nusbaum, one of the incorporators. Frank A. Zink also was named in the incorporation.

* * *

THE BAY STATE CASTING CO., has announced that it will place in operation the plant of the former Bay State Foundry Co., Westfield, Mass., which has been idle the past year. The new company will do a jobbing business. Those interested in the new venture are Messrs. Haswell, Hunter and Rumyon, all of Dayton, O., and Theodore R. Brien, Westfield, who is to be factory manager. The business is to be incorporated shortly.

* * *

ADDITIONS to the plant of the A. J. Lindemann & Hoverson Co., Milwaukee, costing $100,000 will be built at once by Klug & Smith, 65 Wisconsin street, consulting and contracting engineers. The company manufactures stoves and ranges and sheet metal heaters and owns the Alcazer Stove & Range Co., Milwaukee. The works are situated at Twenty-third and Cleveland avenues. A. J. Lindemann, president and general manager, returned a short time ago from an extensive business trip through Great Britain and the Continent.

* * * *

HENRY DISSTON & SONS, INC., have leased a site in Seattle for the erection of a new building for the Seattle branch. Headquarters for this company were established in Seattle several years ago and since that time branches have been located at Portland, Ore. and San Francisco. According to officials of the company immediate plans call for a building to contain a repair shop and factory, warehouse, showrooms and offices.

* * *

PRESENT capacity of the Carolina Iron & Steel Co., Greensboro, N. C. will be doubled upon completion of the plant addition now under construction. When the company was first organized the plant had a capacity of 100 tons per month. In 1921 this was increased to 500 tons and production will reach 1000 tons with the new addition. The company is headed by the following officers: W. C. Boren, president; W. B. Truitt, vice president; and J. W. McLennah, secretary-treasurer. The company designs and fabricates steel buildings, bridges, reinforcing, smokestacks and miscellaneous steel work.

* * * *

PURCHASE of the plant of the Supreme Motor Corp., Warren, O. by the Sterling-Knight Co., recently has been announced. The plant is completely equipped, making possible immediate production. According to J. V. Thomas, sales manager of the Sterling-Knight Co., production will be started the latter part of July at the rate of 25 cars per day. The officers of The Sterling-Knight Co., are P. H. Withington, president, treasurer and general manager; A. W. Green, vice president; J. G. Sterling, vice president; Alonzo M. Snyder, secretary; J. V. Thomas, sales manager; J. P. Johnson, factory manager.

Wage-Fixing by State Unlawful

United States Supreme Court Declares Unconstitutional That Part of Kansas Industrial Act Denying Liberty of Contract—Powers of Body Sponsored by Former Governor Allen Greatly Curbed

WASHINGTON, June 19.—A vital part of the act creating the Kansas court of industrial relations—that part purporting to give the court the right to fix wages—has been held unconstitutional by unanimous opinion of the United States Supreme Court. While the Supreme Court has not passed on the constitutionality of the act as a whole, the effect of its opinion is to place a serious restriction on the operation of the industrial court in attempting to settle disputes. The act in so far as it permits the fixing of wages is held to be in conflict with the fourteenth amendment of the constitution, safeguarding the rights of property and individual liberty.

The case came before the Supreme Court on an appeal by the Charles Wolff Packing Co. of Kansas, from a decision of the Kansas supreme court upholding the right of the industrial court to fix wages of employes of the packing company. The Supreme Court reversed the judgment of the Kansas state court.

The industrial court prescribed wages for the company's employes, which the company complained it was unable to pay and continue in business. The court's order directed a working day of eight hours and time and one-half pay for overtime. It also ordered that the company provide work every month with a monthly wage sufficient to constitute a fair wage as defined by the court.

The act of 1920, sponsored by Henry J. Allen, then governor, which authorized the establishment of the industrial court declared the following to be affected with "a public interest:"

First, manufacture and preparation of food; second, manufacture of clothing; third, production of any substance in common use for fuel; fourth, transportation of the foregoing; fifth, public utilities and common carriers.

The unanimous opinion delivered by Chief Justice Taft on June 11 contained this statement with reference to wages and prices:

"It has never been supposed, since the adoption of the constitution, that the business of the butcher, or the baker, the tailor, the wood chopper, the mining operator, or the miner, was clothed with such a public interest that the price of his product or his wages could be fixed by state regulation."

The rights of employers as well as those of employes are further defined by the court as follows:

"To say that a business is clothed with a public interest is not to import that the public may take over its entire management and run it at the expense of the owner. The extent to which regulation may reasonably go varies with different kinds of business. The regulations of rates to avoid monopoly is one thing. The regulation of wages is another. A business may be of such character that only the first is permissible, while another may involve such a possible danger of monopoly on the one hand, and such disaster from stoppage on the other, that both come within the public concern and power of regulation."

After reviewing details of the case, Chief Justice Taft said:

"The necessary postulate of the industrial court act is that the state representing the people is so much interested in their peace, health and comfort that it may compel those engaged in the manufacture of food and clothing and the production of fuel, whether owners or workers, to continue in their business and employment terms fixed by an agency of the state if they cannot agree. Under the construction adopted by the state supreme court the act gives the industrial court authority to permit the owner or employer to go out of the business, if he shows that he can only continue on the terms fixed at such heavy loss that collapse will follow; but this provision, under the circumstances, is generally illusory.

"A laborer dissatisfied with his wages is permitted to quit, but he may not agree with his fellows to quit or combine with others to induce them to quit.

"These qualifications do not change the essence of the act. It curtails the right of the employer on the one hand and of the employe on the other to contract about his affairs. This is part of the liberty of the individual protected by the guaranty of the due process clause of the Fourteenth amendment.

An important element of the case was the fact that the counsel for the state sought to justify the regulation by citing the federal's government's action in connection with railroad employes' wages. The Supreme Court held that the great temporary public exigencies recognized by all and declared by congress were very different from that upon which control under the Kansas act is asserted. On this point, chief Justice Taft said:

"Here it is said to be the danger that a strike in one establishment may spread to all the other similar establishments of the state and county and thence to all the national sources of food supply so as to produce a shortage. Whether such danger exists has not been determined by the legislature, but is determined under the law by a subordinate agency, and on its findings and prophecy owners and employers are to be deprived of freedom of contract and workers of a most important element of their freedom of labor.

"The minutely detailed government supervision, including that of their relations to their employes, to which the railroads of the country have been gradually subjected by congress through its power over interstate commerce, furnishes no precedent for regulation of the business of the plaintiff in error whose classification as public is at the best doubtful. It is not too much to say that the ruling in Wilson vs. New (involving the railroad wage question) went to the border-line, although it concerned an interstate common carrier in the presence of a nationwide emergency and the possibility of great disaster. Certainly there is nothing to justify extending the drastic regulation sustained in that exceptional case to the one before us."

Chicago Committee Wins Over Trade Unions

Chicago, June 19.—The citizens committee to enforce the Landis award in the Chicago building trades has refused to recognize the unions which rejected the award and has pledged itself to continue its efforts at least until June 1, 1925.

Nineteen unions stood by their agreements under the award; 14 refused. After 18 months, the 14 unions, according to the committee, realize they have been defeated, and now offer to sign. In the meantime the open shop has been firmly established in their trades, and the committee declares that to compromise now would be disastrous.

The committee states that in 18 months there have been established three conditions previously supposed to be impossible: The elimination of jurisdictional and sympathetic strikes, the fact that a nonunion craftsman can work on buildings in Chicago without being maimed or killed, and that union men in one trade will work peacefully with nonunion men in another trade on the same building.

Obituaries

WILLIAM E. MANNING, vice president in charge of sales for the Youngstown Sheet & Tube Co., died June 15, at Youngstown hospital following an operation. He was stricken while on a recent business trip to New York by a recurrence of a malady from which he suffered about a year ago but from which he apparently had recovered. He failed to rally from the operation.

Mr. Manning was one of the best known of the younger generation of Mahoning valley iron and steel trade leaders. He was born in Youngstown on March 14, 1870 and was the son of the late Dr. and Mrs. John Manning and grandson of Dr. Henry Manning, a pioneer physician of that city. When he was graduated from Rayen high school in the class of 1888, Mr. Manning entered the employ of the Brown-Bonnell Iron Co., and when the Republic Iron & Steel Co., absorbed the Brown-Bonnell works, he was put in charge of the order department by James A. Campbell, then district manager for Republic.

When the Youngstown Iron Sheet & Tube Co., as it then was known, was formed by Mr. Campbell and the late Col. George D. Wick in 1900, Mr. Manning entered its service as assistant to the manager of sales. His executive ability, as well as his practical knowledge of sales matters, gained for him rapid success. In 1913, he was chosen secretary of the company and in 1917, was elected a vice president in charge of sales. He also was president of the Continental Supply Co. and of the Youngstown Steel Products Co., both subsidiaries of the Sheet & Tube company.

Mr. Manning was a member of the American Iron and Steel institute and of the American Institute of Mining and Metallurgical Engineers, besides being a member of a number of clubs in Youngstown and other cities. He was president of the Youngstown Y. M. C. A. a few years ago, and an officer of St. John's Episcopal church from which funeral services were held June 18. James A. Campbell, president of the Youngstown Sheet & Tube Co., after expressing his deep sorrow over the death of Mr. Manning paid him this tribute:

"I always had implicit confidence in his judgment and integrity, not only with reference to sales policies but in other things. His position gave him unusual opportunity to understand the market and the special needs of our customers, and brought him into close touch with our operating department, enabling him to render great assistance to that department in the shaping of operating policies and plans. The success of our company has not been due to any single man, but to the loyal co-operation of many, and no one had more to do with it than Mr. Manning."

WILLIAM E. MANNING

Wiliam T. Isaac, for nearly 25 years vice president and general manager of the Gurney Heater Mfg. Co., Boston, died at his home in West Newton, Mass., June 10, aged 52 years. He had been with the company 30 years.

William McDaniels, president of the California Iron Yards Inc., of San Francisco, and one of the largest and best-known iron and steel scrap men on the Pacific coast, died June 3 at his home in San Francisco.

Harley Brownell Gibbs, Cleveland banker who was interested in various industrial enterprises, died June 16 at his home in Norwalk, O. Mr. Gibbs, who was 74, had been identified with the iron and steel industry through his connection with the King Bridge Co., where he started in 1871 as a bookkeeper. In 1907 he resigned his position as secretary and treasurer of this company and was then made a director. The King Bridge Co. was later absorbed by the Republic Structural Iron Works.

Frederick N. Manross, president of the National Marine Lamp Co., and head of F. N. Manross & Sons, makers of hair springs, both of Forestville, Conn., died at his home in that city, June 10, aged 65 years. He had been prominent in state and city affairs.

Harvey E. Hackenberg, secretary of the Union Carbide & Carbon Corp., Cleveland, and formerly treasurer of the National Carbon Co., Cleveland, died at his home, 12116 Edgewater drive, Lakewood, O. June 13. He was 58 years old.

C. C. Patterson, president and general manager of the Wadsworth Foundry Co., died recently at his home in that city, at the age of 49 years. He was one of the best known foundry men in eastern Ohio, having been identified with Akron foundries and also plants at Barberton in recent years before being head of the Wadsworth Foundry Co.

Cyrus A. Jewett, first vice president of the George Worthington Co., wholesale house of Cleveland, died at his office in Cleveland June 18 at the age of 63. Mr. Jewett entered the service of the Worthington company in 1875 as an office boy. From that position he entered the sales ranks and then became a member of the executive staff. He had been a director and first vice president of the company for several years.

Edward D. Redfield, president of the Taylor & Fenn Co., Hartford, Conn., machinist and founder, died in the Hartford Hospital, June 15, after a long illness, aged 59 years. He was formerly president of the Phoenix Iron Works Corp., vice president of the Franklin Electric Mfg. Co., treasurer of the Hartford Automotive Parts Co., and a director of the Whitlock Coil Pipe Co., and the Johns-Pratt Co., all of Hartford.

Jacob John Hilpertschauser, president of the Optenberg Iron Works, Sheboygan, Wis., died June 11 at the Optenberg plant, at the age of 58. Mr. Hilpertshauser started in the iron and steel industry in the shops of The Globe Co., founder and machine shop operator of Sheboygan where he was a machinist. He later was superintendent, president and part owner of this company, and bought into the Optenberg Iron Works in 1918 becoming president of that organization at that time.

Buying Lighter in Tool Market

Demand for Special Production Machines Stands Out in Otherwise Listless Market—Shipments Are Good and Potential Business in Sight Promises Well for Resumption of Buying in Fall

ADDITIONAL evidence is appearing to indicate that the seasonal decline in the machine tool market, which in some years occurs as late as July, will be reflected when the June orders are totaled. Dealers report that sales thus far in the month are of less volume than those in the corresponding period in May. This is attributed to a lull in purchases by motor car builders, hesitancy on the part of the railroads to close on current inquiries and the postponement of buying by companies in the general manufacturing field.

Among those active in the market during the week is the Westinghouse Electric & Mfg. Co., which in addition to purchasing a few tools for its South Philadelphia plant, still is taking bids on its list of 75 items for its recently acquired Sharon, Pa., transformer works. The General Electric Co. is considering tools for its Pittsfield, Mass., plant. The Railway Steel Spring Co. will require equipment for its Latrobe, Pa., plant.

Buying by eastern railroads is light, although the New York, New Haven & Hartford, the Pennsylvania and Nickel Plate are considering bids for modest lists of equipment. Several western roads have bought a number of tools from eastern builders, the purchasers being the Union Pacific, the Northern Pacific and Atchison, Topeka & Santa Fe. The Chicago & Northwestern has purchased five planers from a Cincinnati builder, and the Louisville & Nashville has bought a few tools in the Cincinnati market. The J. A. Fay & Egan Co. has taken two tools for its Oakley plant.

An encouraging feature of the market is the rather general belief that the potential business now in sight means an active demand will be felt in September and October. It is significant that much of the present business is based on the requirements of manufacturers for special production machines, such equipment taking precedence over standard general-purpose tools.

The used machinery market is featureless. Sales of small lots are continuing at a fair rate and except in one or two cases, dealers report that June will prove to be a lighter month than May in point of total business transacted. A number of auction sales are scheduled for the coming week, and the confidence of dealers in the belief a revival of demand will appear after the vacation season is reflected by the fact that they are active in scouting for used equipment with which to increase their stocks.

Prospective Fall Demand Encourages Dealers

NEW YORK, June 19.—Business in the machine tool market locally is featured in buying by the American Locomotive Co. for its Schenectady, N. Y., plant. Included in items placed with one builder are a 6-foot radial drill, a double traveling head shaper, a 100-inch vertical wheel boring and turning mill, a locomotive axle turning lathe, a 60-inch planer, and 32-inch shaper. Other tools bought include a small boring mill and a 5-foot radial drill.

While buying by eastern railroads continues quiet, some scattered orders are being placed with eastern builders by western lines. The Union Pacific has bought a couple of machines, completing the list reported several weeks ago. The Atchison, Topeka & Santa Fe. has closed on a 36-inch planer, one 1100-pound steam hammer and two 2000-pound steam hammers, and the Northern Pacific, a car wheel borer. The New York, New Haven & Hartford railroad has brought out an additional list of six or seven tools, composed chiefly of woodworking machines.

The Norfolk & Western has placed an order for two 150-ton electric overhead cranes, but so far as can be learned has not closed its machine tool requirements. The Pennsylvania railroad is closing on a couple of machines for one of its eastern shops, but as yet has not come into the market with anything like a substantial list for the East.

Calendar and Selected News of Plant Liquidations, Wholesale Offerings, Auctions of Used and New Equipment, Etc., Page 98, Classified Machinery Section.

The General Electric Co., Schenectady, N. Y., has brought out some further requirements, including three milling machines, and the board of purchase, New York city, will close bids June 2 on a milling machine. The Westinghouse Electric & Mfg. Co. has recently closed on two machine tools for its South Philadelphia plant, and is expected to make further purchases shortly. Notwithstanding a number of manual training schools either under way or contemplated, school demand at the moment is light. The Railway Steel Spring Co., 30 Church street, New York, will be in the market shortly for a list for a new addition at Latrobe, Pa.

Although still restricted, export demand so far this year shows a substantial improvement over the corresponding period of last year. For most sellers, March was the best month this year, although one leading seller reports May as the most active period in many months. Virtually all machine tool exporters are agreed that May was a decidedly better month than April, and present indications point to at least as good a month in June. A particularly encouraging feature is the breadth of demand, orders being noted from all parts of the world. However, until Europe is in a position to buy anything like her normal requirements an active export market is hardly to be expected. Japan, a good buyer normally, is doing little, having been virtually out of the market for the past three months.

Crane demand the past week has been featureless, there being little outstanding in either inquiry or buying. Some substantial business is likely to drop, however, at anytime.

June Sales Show Decline

CLEVELAND, June 19.—With more than half of June in the background, it now is quite certain that the sales of machine tools for the month will fall below the total for May. Inquiries continue to be received in fair volume and shipments still are sufficient to keep the plants of builders operating at from 60 to 70 per cent of capacity.

A number of railroad inquiries are receiving attention. Of these, the largest is one from the Nickle Plate for more than a dozen miscellaneous repair shop

tools. Small lists from the Pennsylvania and other roads also are before Cleveland dealers.

The slump in activity may be considered seasonal, although some dealers point out that in past years it frequently has not appeared until early in July. The potential market is good, in the opinion of a number of dealers, who are confident that more active demand will be felt in September and October.

While sales of used machinery are of moderate volume, inquiries during the week have brought forth more optimism on the part of most dealers. The railroads are purchasing some tools, but the bulk of the demand for second hand equipment is coming from manufacturers. A number of turret lathes have been sold during the week, one going to the Poole Engineering Co., Baltimore. A lot of eight miscellaneous used tools has been sold by a local dealer to a St. Louis manufacturer. In general, sales thus far in June seem to be slightly less in volume than those during the corresponding period in May. However, one dealer in used equipment reports an improvement in June over May.

Inquiry Improves

BOSTON, June 19.—Three sales of moderate size helped to liven up an otherwise dull week in the machine tool market. A western Massachusetts manufacturer took four tools including a milling machine and planer and is understood to still be in the market. Another Massachusetts manufacturer bought a milling machine and several grinding machines and a Rhode Island textile mill bought several new tools totaling between $10,000 and $12,000. Prices of tools have not changed during the week. Inquiry is reported by most dealers as considerably improved over that of a week ago.

A Springfield, Mass., manufacturer is in the market for a special milling machine, a drill, and some other tools. A New England railroad is on the point of buying. The General Electric Co. is considering tools for its Pittsfield, Mass., plant. A Standard Oil subsidiary is buying tools. New England manufacturers are all busy and report incoming orders as holding their own although somewhat less in volume than present rate of production. Several lists of tools are offered at auction. Fifteen to twenty woodworking machines at the George S. Bond Co., Charlestown, N. H., are up for sale this week. Lathes, grinding machines, milling machines, and radrial drill are offered by J. E. Conant & Co.

Sales Show Improvement

TORONTO, Ont., June 18.—Sales of machinery and machine tools continue to show improvement and orders closed during the past week or ten days included one for some $100,000 worth of tools for the new car shops under construction for the Toronto Transportation commission. While a number of fair sized lists are continually making their appearance in the market, it is pointed out by dealers that the greater part of their sales are for two or three tools to a customer. Some good business has been booked during the past few weeks for equipment for technical and other schools, and work has just been sent out that C. W. Dawson Chairman of the Guelph Advisory Industrial Committee, 9 Clinton Street, Guelph, Ont., will purchase lathes, drills, milling machines, woodworking machines and auto accessories for the machine, auto-mechanics and woodworking shops to be installed in the new Vocational School. The Laminated Materials, Ltd., Sapperton District, B. C., is placing orders for machinery to increase the output of its plant for the manufacture of cottonwood veneer. Small tools are moving briskly.

The Dodge Bros. Motor Car Co., Windsor, Ont., have started work on a manufacturing plant there for which some equipment will be required Pembroke, Ont., J. P. Howe, engineer, will build adidtionto waterworks plant and is interested in equipment for same. The Western Steel Products, Ltd., Winnipeg, Man., is installing equipment in a building at Port Arthur, Ont., for the manufacture of range boilers, oil barrels, etc. Port Colborne, Ont., will install waterworks plant to cost about $75,000. The Renfrew Flour Mills, Ltd., Renfrew, Ont., will erect flour mill to cost $200,000 for which equipment will be purchased. It is expected that the Montreal Harbor commission, Montreal, Que., will shortly be in the market for tools and equipment for machine shop to replace that recently destroyed by fire. Moncton, N. B., will build addition to waterworks to cost $25,000. The Steel Furnishing Co., New Glasgow, N. S., is rebuilding mattress factory, building and equipment to cost $15,000.

Situation Is Brighter

PITTSBURGH, June 19.—Although there is a decided tendency in the machine tool and equipment market to defer action on purchases, a better feeling exists than a few weeks ago. Most of the delay is brought about in directions where labor shortages militate against the full utilization

Crane Awards and Inquiries of the Week

Orders Placed

One 20-ton Ohio locomotive crane for the Harrison Engineering Co. Buffalo, to Philip T. King, 30 Church street, New York city.

One 20-ton Ohio locomotive crane for the Central Construction Co., Harrisburg, Pa., to Philip T. King, 30 Church street, New York city.

One 5-ton crane, approximately 30-foot span, for the Poughkeepsie Water commission, Poughkeepsie, N. Y., to unnamed builder.

One monorail system, with transfer crane, for the Wesel Mfg. Co., Brooklyn, to the New Jersey Foundry & Machine Co.

One 20-ton handpower crane, for the Cuba & America Sugar Corp., New York city, to the Whiting Corp.

One 10-ton electric crane, for the Hudson Coal Co., Scranton, Pa., to the Whiting Corp.

One 20-ton handpower crane for the West Indies Sugar Finance Corp., New York city, to the Whiting Corp.

Three 1-ton single 1-beam cranes, 18-foot span, for Fort Tilden, Brooklyn to the New Jersey Foundry & Machine Co.

Nine hoists, seven of one tons capacity and two of two tons, for Mitsui & Co., New York city, to Northern Engineering Works.

One 3-ton handpower crane, 13-foot span, for the Chandler Construction Co., East Bridgewater, Mass., to the H. D. Conkey & Co.

One 15-ton locomotive crane for M. A. Long, New York city, to the Brown Hoisting Machine Co.

One logging crane for the Wilderness Lumber Co., Charleston, W. Va., to the American Hoist & Derrick Co.

Two 150-ton electric overhead cranes for the Norfolk & Western, to an eastern builder.

One 40-ton electric crane, 80-foot span, for the M. W. Kellogg Co., Jersey City, to an eastern builder.

Orders Pending

Four 1-ton electric hoists for the Dutch East Indies, to be purchased through B. G. B. ter Graake, 80 Wall street, New York city.

Several cranes and hoists for the Calumet & Arizona Mining Co., New York city, specifications as follows: One 5-ton, one 3-ton, and one 1-ton crane to be equipped with electric hoist; one 10-ton hoists and crawler; one 10-ton geared trolley hoist; and seven monorail hoists ranging from two to six tons capacity.

One 1-ton hoist for New York city sewage disposal plan, bids being asked through Shelvin Engineering Co., West Thirty-fourth street.

Several small cranes for the Otis Elevator Co., Eleventh avenue and Twenty-sixth street, New York city.

One 10-ton electric overhead crane for the Westinghouse Electric & Mfg. Co., South Philadelphia, this being in addition to the 10-ton crane reported in last week's issue.

One 1-ton monorail system for the Bayonne plant of the Standard Oil Co. of New Jersey, specifications formerly calling for a 2-ton system.

of present equipment. Practically all sellers of new equipment report the disposal of a few items each week, mostly in groups of one. two or three machines. No large orders are being placed. While it is reported from Sharon, Pa., that the Westinghouse Electric & Mfg. Co., already has purchased hand shears, plate machinery, lathes, shapers, and milling machines, local sellers report they still are bidding on this list of 75 or 80 items including many presses for transformer work and that the bids are being tabulated. Orders are expected to be placed within a short time. All sellers report that they have numerous projects lined up awaiting the decisions of the operating heads. It now is reported that the Pennsylvania will take action on at least six lathes wanted for Conway, Pa., shops within a week or 10 days. The Atlas Steel Corp., Dunkirk, N. Y., is buying a straightener machine.

In connection with used machinery a fairly active market exists, although here also, the majority of buyers hesitate to close, either in the hope of developing figures lower than the comparatively attractive ones now offered to them or because they as yet are doubtful about the continuance of the trend toward business activity instead of a long extended quiet period. The Wheeling Steel Corp., has been buying some equipment including a shear. Other nearby purchases closed on two or three drill presses, a light 4-foot radial drill, keyseaters and small lathes. One seller disposed of a double end punch and shear to a Toledo, O., user. Inquiries pending included a roll lathe, a 9-foot radial drill and a bulldozer.

Total Business Closed

CHICAGO, June 19.—Closing of some business by railroads on their pending lists is giving renewed activity to a sluggish market for machine tool equipment at Chicago. A large total of machines needed by railroads has been pending but has been delayed in closing. The Chicago & Northwetsern railroad has closed its entire list, involving more than 20 pieces of shop equipment, and the Chicago, Rock Island & Pacific railroad has bought a radial drill, a gap lathe and a boring mill. The latter road has a number of other tools to place and probably will distribute them shortly.

Some delay is being met in closing the Denver & Rio Grande Western list. The method of buying by this road is undergoing a change under the direction of a new receiver, causing a holdup. General buying continues slow as users hesitate to place their requirements. Prices are none too steady and it appears that in some cases recently announced increases in price are not being adhered to, with the result that competition is keen in some lines. Good used machinery is being considered in a number of cases and as prices are much below those applying on new equipment it is a desirable substitute.

Buying Slackens

MILWAUKEE, June 19.—Manufacturers of metalworking machinery are running shops at the same rate of capacity as that reached in the early part of May, but advance orders have been declining slowly while purchases for immediate needs are somewhat smaller. No significance is attached to this condition, for it is customary for business to decline toward mid-year. Although reports have come from some other markets that tool shops have received cancellations, local concerns have had no such experience. The big buying of machine tools by automobile shops seems to be over, at least until next fall. Railroad purchases so far as this market is concerned, are not large, but considerable buying of heavy equipment, such as locomotive cranes, wrecking outfits, etc., is being done.

Bulletin Board

Requests for Equipment and Supplies, Trade Literature, Etc., Made Through IRON TRADE REVIEW

The Manufacturers Soap & Chemical Co., Cleveland, Tenn., which is establishing a plant, is desirous of receiving catalogs of handling, mixing and chemical machinery and equipment.

* * *

The Patterson Tool & Supply Co., Dayton, O., is in the market for two each of the following machines: 20, 22 *and* 26-*inch new or used heavy duty lathes of* 12 *or* 14-*foot length.*

Construction and Enterprise

Concise and Timely Business Building Opportunities from the Field of Industry

East of the Mississippi River

GADSDEN, ALA.—The Ideal Cap Co. Ltd., plans to erect a 100x150-foot building and install die casting machines for manufacture of auto gas caps, radiator caps, etc.

MERIDEN, CONN.—The Wolf New Process Abrasive Wheel, Inc., has let the contract for a brick and steel 1-story factory addition.

NEW HAVEN, CONN.—Capitalized at $50,000 Excelsior Boiler Works has been incorporated by Elijah Williams, Archibald Hewitt and Sarah Williams, all of New Haven.

PLAINSVILLE, CONN.—The Standard Seel & Bearing, Inc., will erect two brick 1-story factory additions, 50x200 feet and 60x150 feet respectively.

SOUTHINGTON, CONN.—The Tobin Tool Co. has been incorporated for $100,000 to manufacture tools by William S. Thomson of Southington, Joseph C. Bannin of Hasbrouck Heights, N. J., and Robert W. Pain of Meriden, Conn.

TORRINGTON, CONN.—The Altman Mfg. Co. has been incorporated to make and deal in hardware.

WATERBURY, CONN.—Plans have been completed by the Scovil Mfg. Co. manufacturer of brass products, for a 1-story addition.

WILMINGTON, DEL.—The Northrow Piston Ring Co., Inc., has been incorporated by F. R. Hansell, J. Vernon Pimm and E. M. MacFarland of Philadelphia, with a capital stock of $200,000. Piston rings will be manufactured.

WILMINGTON, DEL.—The Texas Steel Co. has been incorporated with a capital stock of $5,000,000 to deal in iron and steel.

AVERYVILLE, ILL.—The Universal Tamping Machine Co. has been incorporated with a capital stock of $50,000 for the manufacture and sale of concrete and similar machinery.

CHICAGO—Plans are being drawn for the construction of a pattern shop by the Foundry Co., 1338 Cortland avenue.

CHICAGO—The F. A. Cummings Foundry, 2019-27 Southport avenue will build a two story shop and shipping room costing $15,000.

CHICAGO—Jones, MacNeal & Camp Mfg. Co., 1040 Otis building, has been incorporated

by Kenneth MacNeal, George W. Wilson, Lee C. Robinson to deal in tools, machinery and machine tools.

CHICAGO—The Avalon Iron Works has increased its stock from $5000 to $20,000 and the directors from four to six.

CHICAGO—The Drekolias-Avythistos Shipbuilding Co., 168 N. Michigan avenue has been incorporated by George L. Carahalios, Constantinos C. Maniatis, George C. Sarantekis with a capital of $2,000,000.

DANVILLE, ILL.—The Modern Machine Shop plans the erection of a 2-story addition.

EAST MOLINE, ILL.—The Tri-City Malleable Castings Co. has been incorporated by Frank S. Mangan, H. C. Smith and E. A. Biggs, with a capital stock of $200,000. The company engages in a general foundry business.

ELKHART, IND.—The Buescher Band Instrument Co., is taking bids for the construction of a 2-story factory addition, 100x150 feet and costing $75,000.

FT. WAYNE, IND.—A manual training department will be installed in the new junior high school to be built at an estimated cost of $400,000.

HUNTINGTON, IND.—Orton-Steinbrenner Co., 608 South Dearborn street, Chicago has been awarded the contract for the construction of a machine shop here. The building will be 1-story, 100x240 feet of brick and steel construction.

INDIANAPOLIS, IND.—Robert H. Hassler, Inc. plans a 3-story building costing $100,000.

INDIANAPOLIS, IND.—Work is expected to start at once on a brick and steel factory addition to the plant of Chandler & Taylor Co. The building will be 90x252 feet costing about $50,000.

INDIANAPOLIS, IND.—The Shelton Vapor Stove Co. has been incorporated with a capital stock of $100,000. Directors are Thomas J. Kelly, Ira S. Dowing and Maurice C. Shelton.

SOUTH BEND, IND.—Plans are now ready for the construction of a 2-story 63x148 foot vocational building costing $100,000.

TERRE HAUTE, IND.—The Chicago Eastern Illinois railroad is contemplating the building of a round house and terminal shops at a cost of $5,000,000.

LOUISVILLE, KY.—The National Forge Co. has increased its capital from $75,000 to $100,000.

PORTLAND, ME.—The Cumberland Iron & Steel Co. has been organized to deal in new and second hand machinery.

PORTLAND, ME.—The Thomas Plow Co. has been incorporated with 100 shares of stock without par value by Horace S. Thomas, Westbrook, Me., Charles A. Thomas and Solomon W. Bates.

ATTLEBORO, MASS.—The M. S. Co. has been incorporated to make metal goods with $150,000 capital by Samuel M. Einstein, Max Schweinshaut and Eugene Claupin.

ATTLEBORO, MASS.—The American Metalcrafts Co. has been incorporated to make jewelry with $50,000 capital by Thomas Kelleher, John Maguire and Robert J. Brown.

BOSTON—The Individual Gasolene Pump Corp. has been incorporated for $100,000 by Abraham Baisuck, Louis K. Cutler Jr., Percy K. Snow, William Marshall Jr., and John N. Ginsburg of Beverly, Mass.

BOSTON—The Winchester-Simmons Hardware Co. plans to move its offices at 49 Summer street, Boston, to Springfield, Mass.

BOSTON—The Individual Gasolene Pump Corp. has been incorporated to make pumps with $100,000 capital by Abraham Baisuck, Louis K. Cutler, Jr., Percy K. Snow and others.

BOSTON—The E. Van Noorden Co. has been incorporated as a sheet metal worker with $1,000,000 capital by William G. Kiefer, Ezekiel Van Noorden, Brookline, Mass., and Walter Hartstone.

EVERETT, MASS.—The General Electric Co. is receiving bids for three buildings here.

LOWELL, MASS.—Contract has been let to the E. H. Porter Co., Boston, for the erection of a 40x100-foot forge shop for the Saco-Lowell shops. Plans were prepared by Lockwood, Green & Co., Boston.

MONSON, MASS.—Rubwheel, Inc., has been incorporated to make automobile wheels with $250,000 capital by Harry N. Atwood, Harry E. Kendall and William G. Giles, Longmeadow, Mass. The company is erecting a 100 x45-foot factory.

NEWBURYPORT, MASS.—The Noyes-Cashman Hardware & Stove Corp. has been incorporated for $25,000 by Augusta H. Noyes, Daniel Cashman, Edmund M. Dow and Charles E. Whitley Jr., all of Newburyport.

NORTH ANDOVER, MASS.—Contract has

Warehouse Steel Prices

Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Boston	3.515c
Buffalo	3.55c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Cleveland	3.36c
Detroit	3.35c
Los Angeles	4.30c
New York	3.54c
Philadelphia	3.55c
San Francisco	4.00c
Seattle	4.10c
St. Louis	3.35c
St. Paul	3.45c

IRON BARS

Boston	3.515c
Buffalo	3.50c
Chicago	3.20c
Cincinnati	3.40c to 3.50c
Detroit	3.35c
New York	3.54c
Philadelphia	3.55c
St. Louis	3.35c

SHAPES, STRUCTURAL

Boston	3.615c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Los Angeles	4.40c
New York	3.64c
Philadelphia	3.65c
San Francisco	4.10c
Seattle (large shapes)	4.20c
St. Louis	3.45c
St. Paul	3.55c

PLATES

Boston	3.615c
Boston 3/16-inch	3.04c
Buffalo	3.65c
Chicago	3.30c
Cincinnati	3.50c to 3.60c
Cleveland	3.46c
Detroit	3.45c
Detroit, 3/16-inch	3.45c
Los Angeles	4.45c
New York	3.64c
Philadelphia	3.65c
Philadelphia, 3/16-inch	3.95c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.45c
St. Paul	3.55c

NO. 10 BLUE ANNEALED SHEETS

Boston, 3/16-inch	4.615c
Buffalo	4.45c
Chicago	4.35c
Cincinnati	4.10c
Cleveland	3.90c to 4.06c
Detroit	4.30c
Los Angeles	5.20c
New York	4.59c
Philadelphia	4.25c
San Francisco	5.25c
Seattle	4.75c
St. Louis	4.45c
St. Paul	4.60c

NO. 28 BLACK SHEETS

Boston	5.75c
Buffalo	5.25c
Chicago	5.20c
Cincinnati	4.90c
Cleveland	4.75c
Detroit	5.15c
Los Angeles	6.50c
New York	5.15c
Philadelphia	5.15c
San Francisco	6.30c
Seattle	5.75c
St. Louis	5.30c
St. Paul	5.45c

NO. 28 GALVANIZED SHEETS

Boston	6.90c
Buffalo	6.35c
Chicago	6.35c
Cincinnati	5.90c
Cleveland	5.90c
Detroit	6.30c
Los Angeles	7.30c
New York	6.05c to 6.15c
Philadelphia	6.25c
San Francisco	7.15c
Seattle	6.75c
St. Louis	6.45c

BANDS

Boston	4.80c
Buffalo	4.35c
Chicago	3.95c
Cincinnati	4.00c to 4.10c
Cleveland	4.01c to 4.16c
Detroit	4.10c
Los Angeles	5.20c
New York	4.39c
Philadelphia	4.35c
San Francisco	4.75c
Seattle	5.10c
St. Paul	4.20c

HOOPS

Boston	5.80c
Buffalo	4.65c
Chicago	4.55c
Cleveland	4.01c to 4.16c
Detroit	4.95c
New York	5.19c
Philadelphia, 1 inch and wider 20 gage and heavier	4.75c
Seattle	5.50c
St. Paul	4.80c

COLD ROLLED STEEL

Boston (rounds)	4.75c
Boston (shapes)	5.25c
Buffalo (rounds)	4.70c
Buffalo (shapes)	5.20c
Chicago (rounds)	4.30c
Chicago (shapes	4.80c
Cincinnati (rounds)	4.50c
Cincinnati (shapes)	5.00c
Cleveland (rounds)	4.25c
Cleveland (shapes)	4.75c
Detroit (rounds)	4.55c
Detroit (shapes)	5.05c
Los Angeles (rounds	5.25c
New York (rounds)	4.65c
New York (shapes)	5.15c
Philadelphia (rounds)	4.35c
Philadelphia (shapes)	4.85c
San Francisco (rounds)	5.50c
Seattle (rounds)	6.00c
St. Paul (rounds)	4.55c

Bourne-Fuller Service

includes immediate shipment of all Iron and Steel materials from Cleveland and Cincinnati

Warehouses

If you are not receiving our Stock-list we shall be glad to send it to you regularly upon request.

Upson Works

Open Hearth Steel Bars for special uses. Also a complete line of Bolts and Nuts. Prompt Shipments.

THE
BOURNE-FULLER CO.
Iron, Steel
Pig Iron
Coke

CLEVELAND

New York **Chicago** **Detroit**
San Francisco
Cincinnati

been awarded for the construction of a steam plant for the M. T. Stevens & Sons Co.

SPRINGFIELD, MASS.—Contract has been awarded for a substation for the United Electric Light Co.

WARE, MASS.—Fire destroyed the plant of the Ware Foundry Co. June 7.

WARE, MASS.—The main plant and pattern shop of the Ware Founlry Co. was destroyed by fire with a $20,000 loss. The plant will be rebuilt at once.

DETROIT—Plans are being drawn for a power plant and substation for the city of Detroit.

HAMTRAMK, MICH.—The Detroit Foundry Co. plans to build a factory and assembly plant.

NEWARK, N. J.—A 1-story foundry addition will be erected here by the Meeker Foundry Co., manufacturer of malleable iron castings.

NEWARK, N. J.—Approximately 54 acres have been acquired by the Lidgerwood Mfg. Co., manufacturer of hoisting engines and machinery. According to present plans a portion of the property will be used for a site for a new plant, the present branch works in Brooklyn, to be moved to this location.

TRENTON, N. J.—General contract for the erection of a 1-story plant addition for the Crescent Insulated Wire & Cable Co., has been awarded the Karno-Smith Co.

BROOKLYN, N. Y.—R. Rothschild has been incorporated by R. Rothschild, M. Rothschild and A. Miller with a capital stock of $200,000 to deal in machinery and metal products.

NEW YORK—The New Jersey Commercial Body Co. plans to build a factory 100x280 feet.

NEW YORK—Property has been acquired in West Sixty-fifth street by the Stewart Warner Speedometer Corp., as a site for a branch plant.

NEW YORK—The Charles Levy Iron Works has been incorporated with a capital stock of $10,000 by C. M. Levy and H. Levy.

NEW YORK—The capital of the Central Machinery & Supply Co. has been increased from $5000 to $50,000.

NEW YORK—The United Steel Tube Co. has been incorporated by A. Seril, R. Seril and C. Gottdiener with a capital stock of $25,000.

NEW YORK—A $900,000, 6-story service and storage building will be erected at 612 West 132nd street by the Studebaker Corp. of America. The W. S. Ferguson Co. is the architect and Wharton Green & Co., the general contractors.

UTICA, N. Y.—An $80,000 ice plant will be erected by the Utica Hygeia Ice Corp.

Business in Canada

VANCOUVER—Charles Murphy, western manager of the Canadian Pacific railway has approved plans for car shops to be erected here at a cost of $100,000. Construction work will be started immediately.

HAMILTON, ONT.—The McCoy-Anderson Radiator Co., Ltd., has been incorporated to manufacture radiators, automobiles, trucks, etc., with $600,000 capital stock; by Luke Smtih, Oakville, Ont.; Thomas G. Anderson, Henry A. McCoy of Hamilton, and others.

TORONTO, ONT.—The Universal Mill Co., Ltd., has been incorporated to manufacture and deal in machinery, tools, and to carry on business and iron founders, brass founders, machinists, etc., with $5,000 capital stock; by Frederick A. Day, John P. Walsh, Thomas M. Mungovan and others.

TORONTO, ONT.—Frankel Bros., Ltd., have been incorporated to acquire and take over the business formerly operated under the name of Frankel Bros. and to manufacture metals, and deal in iron and steel scrap, nonferrous scrap etc., with $1,000,000 capital stock; by Herman Frankel of Montreal, Que.; Leo Frankel, Maurice Frankel and others of Toronto.

TORONTO, ONT.—It is announced that G. A. Mcguire has resigned from the Canadian Tube & Steel Products, Ltd., and intends to organize a company for the manufacture of wrought iron pipe, under the name of Tub Products, Ltd. The Toronto Harbor commission has granted a lease of the plant formerly occupied by the Dominion Ship Yards at the foot of Bathurst Street.

TORONTO, ONT.—The Quinze Power Co., Ltd., has been incorporated to build and operate electric development plants, etc., with $2,000,000 capital stock; by James Aitchison, Collamer C. Calvin, George H. Sedgewick and others of Toronto as provisional directors. The contract for the erection of a power house in connection with the 20,000-horsepower development by the company at Des Quinze river has been awarded to Morrow & Beatty, Peterborough, Ont.

WALKERVILLE, ONT.—The plant of the Standard Foundry & Supply Co. was partly wrecked by an explosion June 8 caused by rain falling on molten metal. Damages will be repaired at once.

WINDSOR, ONT.—The Canadian Sales & Garage Co. Ltd., has been incoroporated to manufacture and deal in automobiles and other vehicles, machinery, engines, and boilers with $50,000 capital stock, by Bernard H. Furlong, William H. Furlong, Horice F. Smith and others of Windsor.

HULL, QUE.—The Capital Heating Co., is having plans prepared by Brodeur & Pilon, 6 Hotel de Ville, Hull, for the erection of a factory on Montcalm street.

MONTREAL, QUE.—The Hygienic Water Service Ltd., has been incorporated to manufacture apparatus for the production and distribution of water, hygienic and dierapentic instruments with $20,000 capital stock, by Joseph

Industrial Business Changes Recently Announced

UNDER the firm name of Ashmead-Danks Co. with offices at 7016 Euclid avenue, Cleveland A. C. Danks and C. B. Ashmead are representing the Tracy Engineering Co. the Bacharach Industrial Instrument Co., the C. Lee Cook Mfg. Co., and the E. A. Wilcox Mfg. Co.

* * *

The Welker Mfg. Co., Middletown, Conn., maker of stamped steel products, has changed its name to the Welker-Hoops Mfg. Co.

* * *

The Halligan Pipe & Supply Co., Chicago, has announced the purchase of the entire plant and assets of the Federal Pipe & Supply Co.

* * *

A branch office of the North American Mfg. Co., Cleveland, has been established in Pittsburgh at 1305 Fulton building with C. J. Brown in charge. A branch has also been established in Detroit under the name of R. A. Smart, 320 McKerchey building.

* * *

The American Frog & Switch Co., Hamilton, O., has opened a sales office at 154 Nassau street, New York.

* * *

The offices of the Fort Pitt Bridge Works at Cleveland recently were moved from 606 Marshall building to 424 Bulkley Building. Ivor M. Williams is in charge of the local office.

* * *

The Machinery Dealer, Inc., New Haven, Conn., has moved its offices and warehouse from 454 to 418 Chapel street.

* * *

P. J. Freeman, mining engineer, formerly engineer of tests with the Pittsburgh Testing Laboratory, is now located at 311 Ross street, Pittsburgh, where he has opened offices for general consulting engineering.

* * *

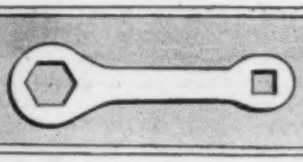
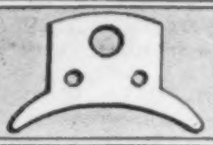
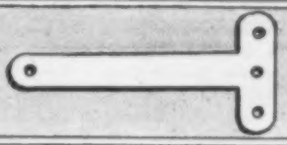
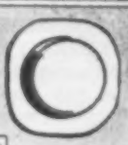
The name of the Polly Mfg. Co., 431 Chestnut street, Milwaukee, manufacturer of lighting fixtures, has been changed to Polly Lane, Inc., by amendment.

* * *

The McCabe & Sheeran Machinery Corp., New York, has established offices in Pittsburgh, 1007 Jones building, 630 Fourth avenue. Frank G. Ryan, secretary, is in charge.

* * *

The Dingle-Clark Co., contracting engineers, Cleveland, announces the opening of a Pittsburgh office at 311 Ross street. The office will be in charge of H. M. Leathers who will direct the sale of the company's line of steam turbines, transformers and electrical construction wares in Pittsburgh territory.

Budd Stampings

If we show you how to cut out that 20 or 30 per cent scrap loss—

And if we show you how to rid yourself of that costly but avoidable expense known as DIE MAINTENANCE—

Should we not then be taken into your confidence and given an opportunity to show you the excellence of our workmanship?

Here is the situation, exactly:

Scrap loss is one of the big expenses of stamping. THE BUDD COMPANY'S Specialty Department, by skillful designing of dies and direction of operations, is able to reduce scrap loss to so small a percentage that it is practically negligible.

And here is another item of no mean importance:

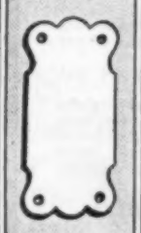
You are aware, of course, that die *upkeep cost* is one of the principal items entering into the cost of stampings. When THE BUDD COMPANY makes your stampings you are immediately relieved of this expense, because THE BUDD COMPANY assumes the entire responsibility for die *maintenance* and *replacement cost*.

Here then are two excellent reasons why THE BUDD COMPANY'S stampings will save you money. Excellent quality is another.

May we submit estimates on your requirements?

Just send us samples or drawings.

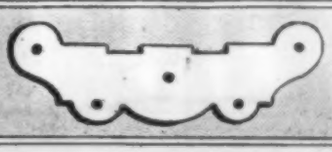
A Very Attractive Cost Reduction

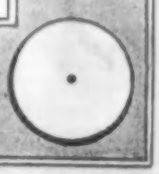


ADDRESS
SPECIALTY DEPARTMENT

EDW. G. BUDD MFG. CO.

Makers of All-Steel Automobile Bodies
PHILADELPHIA, PA.





A. Goyer, Joseph A. Duprat and Ernest H. Champagne of Montreal and others.

MONTREAL, QUE.—The machine shop and repair department of the Montreal Harbor Commission was damaged by fire with a loss to building and machinery of $100,000. Rebuilding will be started without delay.

MONTREAL, QUE.—The Visible Gas-Oil Service, Ltd., has been incorporated to manufacture and deal in motors, engines, machinery, implements, etc., with $49,000 capital stock, by Kendall Morton, James B. Walker, Bert Watkins and others.

MONTREAL, QUE.—The Ruckstell Axle Co., Ltd., has been incorporated to manufacture farm implements, automobiles, axles, machinery, etc., with $400,000 capital stock; by Newton M. Young, Paul I. B. Hinds, Ivan C. Harris and several other persons.

SILLERY, QUE.—The Quebec Pulp & Paper Co. plans to start work in the early future on a ground wood pulp mill here. John D. Roche, Montreal, Que., is interested.

ST. ETIENNE DES GRAS, QUE.—The Shawinigan Engineering Co., is building a power plant here for the St. Maurice Power Co., Ltd., of Cap de la Madeleine, Que.

Iron and Steel Prices

Iron Ore

LAKE SUPERIOR ORES

Per Gross Ton Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Mesabi Bessemer, 55 per cent iron	6.20
Old Range nonbessemer, 51½ per cent iron	5.70
Mesabi nonbessemer, 51½ per cent iron	5.55

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 53 to 63 per cent	10.00 to 11.00
Copper free low phosphorus 53 to 65 per cent	13.25 to 16.50

FOREIGN IRON ORE

Cents per unit, c.i.f. Atlantic ports

Spanish low phosphorus, 52 to 54 per cent	nominal
Algerian low phosphorus, 52 to 54 per cent	nominal
Swedish and Norwegian low phosphorus, 68 per cent	nominal
Swedish foundry or basic, 66 to 68 per cent	11.25
Spanish foundry or basic, 50 to 54 per cent	nominal

Manganese Ore

Prices do not include duty at rate 1 per cent per pound of metallic manganese contained.

Brazilian, minimum 47 per cent	nominal
Indian, minimum 47 per cent	42 cents c.i.f. tidewater
Caucasian, 53 to 55 per cent	
Caucasian, 53 to 55 per cent.	nominal

Fluor Spar

85 and 5% grade

Washed gravel, Kentucky and Illinois mines, per net ton	$23.50

Rivets

Structural rivets, Pittsburgh	3.25c
Boiler rivets, Pittsburgh	3.35c
Rivets, 7/16-in. and smaller	60 and 5 off

Nuts and Bolts

NUTS

(Up to 1¼ and 1⅛ inches inclusive)

Hot pressed square or hexagon blank	$3.25 off list
Hot pressed square or hexagon tapped	$3.00 off list
Cold punched square or hexagon blank	$3.25 off list
Cold punched, square or hexagon, tapped	$3.00 off list
Cold punched semifinished hexagon nuts ⅜-inch and larger	70-10-2½ off
Cold punched semifinished hexagon nuts 9/16-inch and smaller	70-10-5 off

Price f.o.b. Pittsburgh, Packages of 50.

CARRIAGE BOLTS

(¾ x 6 inches, smaller and shorter)

Rolled thread	50 and 10 off
Cut thread	50 off
Larger and longer	50 off

MACHINE BOLTS

(¾ x 4 inches, hot pressed nuts)

Rolled thread	60 off
Cut thread	50 and 10 off
Larger and longer	50 and 10 off

(¾ x 4 inches, cold punched nuts)

Cut thread	45 off
Larger and longer	45 off
Lag screws	60 off
Plow bolts Nos. 1, 2 and 3 heads	50-5 off
4 to 10 heads	50-5+20 off
Stove bolts	75-5 off
Tap bolts	25 off
Bolt ends with hot pressed nuts	50-10 off
Bolt ends with cold punched nuts	45 off
Blank bolts	50 and 10 off
Rough stud bolts with nuts	50 off

WASHERS

Wrought washers	$4.85 to $5.00 off

Steel Pipe

(First column*—effective March 19, 1923)
(Second column—effective April 19, 1923)
*Wheeling Steel Corp. discounts.
Pittsburgh basing discounts, jobbers' carloads.

	Black	Galvanized
Butt Weld		
⅛-inch	44 to 45	18½ to 19½
¼ and ⅜-inch	50 to 51	24½ to 25½
½-inch	55 to 56	41½ to 42½
¾-inch	59 to 60	47½ to 48½
1 to 3-inch	61 to 62	49½ to 50½
Lap Weld		
2-inch	54 to 55	42½ to 43½
2½ to 6-inch	58 to 59	46½ to 47½
7 to 8-inch	55 to 56	42½ to 43½
9 and 10-inch	54 to 54	41½ to 41½
11 and 12-inch	54 to 53	41½ to 40½
REAMED AND DRIFTED		
Butt Weld		
1 to 3-inch	59 to 60	47½ to 48½
Lap Weld		
2-inch	52 to 53	40½ to 41½
2½ to 6-inch	56 to 57	44½ to 45½
EXTRA STRONG—PLAIN ENDS		
Butt Weld		
⅛-inch	40 to 41	23½ to 24½
¼ and ⅜-inch	46 to 47	29½ to 30½
½-inch	52 to 53	41½ to 42½
¾-inch	57 to 58	46½ to 47½
1 to 1½-inch	59 to 60	48½ to 49½
2 to 3-inch	60 to 61	49½ to 50½
Lap Weld		
2-inch	52 to 53	41½ to 42½
2½ to 4-inch	56 to 57	45½ to 46½
4½ to 6-inch	55 to 56	44½ to 45½
7 to 8-inch	51 to 52	38½ to 39½
9 and 10-inch	45 to 45	32½ to 32½
11 and 12-inch	45 to 44	32½ to 31½
DOUBLE EXTRA STRONG		
Butt Weld		
½-inch	41 to 42	31½ to 32½
¾ to 1½-inch	44 to 45	34½ to 35½
2 to 2½-inch	46 to 47	36½ to 37½
Lap Weld		
2-inch	40 to 41	31½ to 32½
2½ to 4-inch	42 to 43	33½ to 34½
4½ to 6-inch	41 to 42	32½ to 33½
7 to 8-inch	37 to 38	24½ to 25½

Wrought Iron Pipe

(Effective Jan. 23, 1923)

Pittsburgh basing discounts, jobbers, carloads

THREADS AND COUPLINGS

	Black	Galvanized
Butt Weld		
¼ and ⅜-inch	+11	+39
½-inch	22	2
¾-inch	28	11
1 to 1½-inch	30	13
Lap Weld		
1¼ and 1½-inch	Upon application	
2-inch	23	7
2½ to 6-inch	26	11
7 to 8-inch	21	7
9 to 12-inch	16	2

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG, PLAIN ENDS

Butt Weld		
¼ and ⅜-inch	+19	+54
½-inch	21	7
¾-inch	28	12
1 to 1½-inch	30	14
Lap Weld		
2-inch	23	9
2½ to 4-inch	29	15
4½ to 6-inch	28	14
7 to 8-inch	21	7
9 to 12-inch	16	2

DOUBLE EXTRA STRONG

Butt Weld		
½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39
Lap Weld		
2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	..

Boiler Tubes

L. C. L. discounts. C. L. 4 points larger

STEEL (Lap welded)

(Effective April 19, 1923)

2 and 2¼-inch	23 off
2½ and 2¾-inch	33 off
3-inch	36 off
3¼ to 3¾-inch	38½ off
4 to 13-inch	42 off

CHARCOAL IRON

(Effective April 12, 1923)

1½-inch	+22
1¾-inch	+12
2 and 2¼-inch	+ 2
2½ to 3-inch	3
3¼ to 4½-inch	5

SEAMLESS COLD DRAWN

(Effective April 19, 1923)

1-inch	51 off
1¼ and 1½-inch	43 off
1¾-inch	27 off
2 and 2¼-inch	18 off
2½ and 2¾-inch	28 off
3 and 3¼-inch	32 off
3½ and 3¾-inch	33 off
4-inch	37 off
4½ and 5-inch	29 off

SEAMLESS HOT ROLLED

3 and 3¼-inch	34 off
3½ and 3¾-inch	35 off
4-inch	39 off

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add $8 per net ton for more than four gages heavier than standard and add 10 per cent to theoretical weight.

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts

Carbon, 0.10 to 0.20 per cent	83 off
Carbon, 0.30 to 0.40 per cent	81 off
Carbon, 0.40 to 0.50 per cent	80 off

Plus differentials and extras for cutting

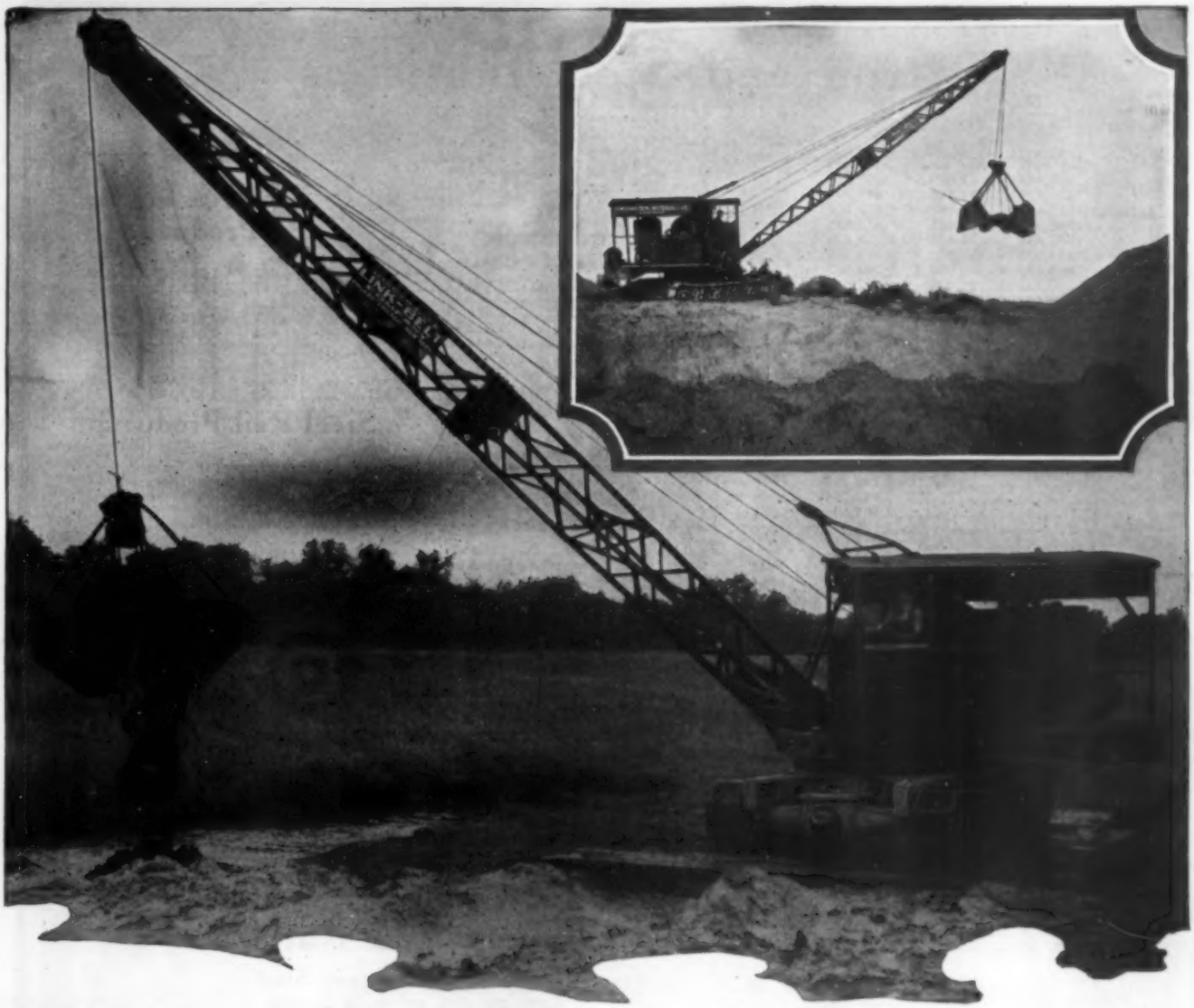
SEAMLESS STEEL LOCOMOTIVE AND SUPER-HEATER TUBES

(Effective April 19, 1923)

Net prices per foot, f.o.b. Pittsburgh

Outside diameter	Gage	Price
2-inch	12-gage	15c
2-inch	11-gage	16c
2-inch	10-gage	17c
2¼-inch	12-gage	17c
2¼-inch	11-gage	18c
2¼-inch	10-gage	20c
3-inch	7-gage	35c
1½-inch	9-gage	15c
5⅜-inch	9-gage	55c
5½-inch	9-gage	57c

Plus usual extras for forming and for long lengths.



Link-Belt Quality in an All-Purpose Crawler Crane

SOUND in engineering principles and construction, durability, strength and long life—these are characteristic of Link-Belt products.

The Link-Belt Crawler Crane is no exception. It is mechanically right, easily operated by one man, and is designed for a wide range of usage.

It can make four complete rotations per minute, travels one mile per hour, and can easily climb a 25 per cent. grade.

It weighs 27 tons. Will lift 12 tons at 12 ft. radius, or 3½ tons at 30 ft. radius. Operates with any type of bucket, and can also be used with electric lifting magnet, or pile driver attachment.

Write for specifications, price and delivery date. Send for book No. 595.

1141

LINK-BELT COMPANY

PHILADELPHIA, 2045 Hunting Park Ave. CHICAGO, 300 W. Pershing Road INDIANAPOLIS, Belmont Ave. at Big Four R. R.

New York . . . . Woolworth Bldg.
Boston 9 . . . . . 49 Federal St.
Pittsburgh . . . . 335 Fifth Ave.
St. Louis . . Central Nat'l Bank Bldg.
Buffalo . . . . 745 Ellicott Square
Wilkes-Barre . . 2d Nat'l Bank Bldg.
Huntington, W. Va. Robson-Prichard Bldg.
Cleveland . . . . 429 Kirby Bldg.
Detroit . . . . 4210 Woodward Ave.
Kansas City, Mo. . 306 Elmhurst Bldg.
Seattle . . . . . 820 First Ave., S.
Portland, Ore. . . . . 101 First St.
San Francisco . . . 168 Second St.
Los Angeles . . 163 No. Los Angeles St.
Denver, Lindrooth, Shubart & Co., Boston Bldg.
Atlanta, 610-611 Citizens and S'thrn. Bk. Bldg.
Louisville, Ky., Frederick Wehle, Starks Bldg.
New Orleans, C. O. Hine, 504 Carondelet Bldg.
Birmingham, Ala., S. L. Morrow, 720 Brown-Marx Bldg.

Canadian Link-Belt Co., Ltd., Toronto and Montreal
H. W. CALDWELL & SON CO., CHICAGO NEW YORK, Woolworth Bldg. DALLAS, TEXAS, 709 Main St.

LINK-BELT

Iron and Steel Statistics

Tin Plate Production

Year	Tin plate Net tons	Terne plate Net tons	Total Net tons
1908	524,448	77,090	601,538
1909	589,929	95,465	685,394
1910	725,411	84,092	809,503
1911	798,814	79,221	878,035
1912	982,830	95,698	1,078,528
1913	854,093	68,472	922,565
1914	969,892	73,098	1,042,990
1915	1,100,913	81,735	1,182,648
1916	1,276,113	107,088	1,383,201
1917	1,616,658	76,946	1,693,604
1918	1,608,124	42,689	1,650,813
1919	1,203,579	85,427	1,289,006
1920	1,539,977	69,112	1,609,089
1921	837,660	50,721	888,381

Sheet Production

Year	
1913	1,921,001
1914	1,668,644
1915	2,106,298
1916	2,492,794
1917	2,595,606
1918	2,176,537
1919	2,316,057
1920	3,133,217
1921	1,713,288

Plate Production

Year	Sheared Gross tons	Universal Gross tons	Total Gross tons
1913	1,844,354	1,158,416	3,002,770
1914	1,346,308	766,133	2,112,441
1915	1,923,199	954,852	2,878,051
1916	2,453,150	1,224,234	3,677,384
1917	2,963,039	1,195,199	4,158,238
1918	3,885,126	1,234,782	5,119,908
1919	2,899,967	992,054	3,892,021
1920	3,505,364	1,249,769	4,755,133
1921	1,189,714	570,610	1,760,324

Shape Production

Year	Gross tons
1908	1,083,181
1909	2,275,562
1910	2,266,890
1911	1,912,367
1912	2,846,487
1913	3,004,972
1914	2,031,124
1915	2,437,003
1916	3,029,964
1917	3,110,000
1918	2,849,969
1919	2,614,036
1920	3,306,748
1921	1,272,624

Bar Production

Year	Iron Gross tons	Steel Gross tons	Total Gross tons
1908	685,233	1,301,405	1,986,638
1909	952,230	2,311,301	3,263,531
1910	1,074,163	2,711,568	3,785,731
1911	835,625	2,211,737	3,047,362
1912	944,790	2,752,324	3,697,114
1913	1,026,632	2,930,977	3,957,609
1914	563,171	1,960,460	2,523,631
1915	657,107	3,474,135	4,131,242
1916	993,948	5,236,354	6,230,302
1917	983,926	5,226,031	6,209,957
1918	846,898	5,395,851	6,242,749
1919	446,549	3,945,075	4,391,624
1920	663,032	5,467,208	6,130,240
1921	198,324	1,367,430	1,565,754

Tube Production

	Iron	Steel	Gross tons
1913	276,067	1,969,465	2,245,532
1914	212,147	1,525,557	1,737,704
1915	206,513	1,713,161	1,919,674
1916	278,117	2,372,941	2,651,058
1917	273,890	2,213,087	2,486,977
1918	202,958	2,087,521	2,290,479
1919	162,356	2,212,575	2,374,931
1920	199,673	2,803,052	3,002,725
1921	110,293	1,877,149	1,987,442

Steel Rail Production

Year	Gross tons
1908	1,920,944
1909	3,023,845
1910	3,635,801
1911	2,822,556
1912	3,327,915
1913	3,502,780
1914	1,945,095
1915	2,204,203
1916	2,854,518
1917	2,944,161
1918	2,540,892
1919	2,203,843
1920	2,604,116
1921	2,178,819
1922	2,171,766

Iron and Steel Freight Rates

Pig Iron

Mahoning and Shenango valleys to:

Cleveland	$1.76
Newark, N. J.	6.05
Boston	6.55
Philadelphia	5.67
Pittsburgh	1.76
Chicago	4.79
St. Louis	5.80
Minneapolis, St. Paul	6.84

Buffalo to:

Albany, N. Y.	$2.27
New England (rail)	4.91
New York and Brooklyn (rail)	4.91
Philadelphia	4.91
Rochester	1.39

Virginia furnaces to:

Philadelphia	$5.17
New England	5.92
Brooklyn, Jersey City, Newark	5.54

Birmingham, Ala., to:

Boston (rail)	$9.61
Boston (rail and water)	6.91
Cincinnati	4.05
Chicago	6.01
Cleveland	6.01
Louisville, Ky.	3.72
Minneapolis, St. Paul	8.76
New York	9.24
Jersey City, Newark	8.28
Philadelphia (rail)	7.80
Philadelphia (rail and water)	6.01
Pittsburgh	6.84
St. Louis	5.17
Seattle	20.16

Chicago to:

Des Moines	$4.26
Minneapolis, St. Paul	3.04
Milwaukee	1.00
Moline, Ill.	1.77
Omaha	5.47
St. Louis	2.16

Ironton and Jackson, O., to:

Chicago	$4.79
Cincinnati	2.27
Cleveland	3.02
Detroit	3.28
Indianapolis	2.90
Minneapolis, St. Paul	7.56

Finished Material

Pittsburgh, carloads, per 100 pounds, to:

New York	$0.34
Philadelphia	0.325
Baltimore	0.315
Boston	0.365
Buffalo	0.265
Cleveland	0.215
Cincinnati	0.295
Chicago	0.34
Detroit	0.295
Minneapolis and St. Paul	0.60
Kansas City	0.735
Denver	1.27
St. Louis	0.43
New Orleans	0.515
Birmingham	0.69
Pacific coast (all rail)	1.495
Pacific coast (tin plate)	1.20

Export Rail Rates

Manufactured Iron and Steel

Cents per 100 pounds in Carloads

From	To New York	To Baltimore	To Boston	To Philadelphia	To Pacific Coast
Pittsburgh	25.50	22.50	25.50	23.50	72.00
Wheeling	25.50	22.50	25.50	23.50	72.00
Youngstown	28.50	25.50	28.50	26.50	72.00
Chicago	42.50	39.50	42.50	40.50	50.00
Cleveland	30.00	27.00	30.00	28.00	72.00
Cincinnati	37.00	34.00	37.00	35.00	72.00
South Bethlehem	11.00	14.50	....	10.00	....

Billets

Per Gross Ton

From	To New York	To Baltimore	To Boston	To Philadelphia	To Pacific Coast
Pittsburgh	$4.30	$3.70	$4.30	$3.90	$16.13
Wheeling	4.30	3.70	4.30	3.90	16.13
Youngstown	4.70	4.10	4.70	4.30	16.13
Chicago	7.10	6.50	7.10	6.70	11.20
Cleveland	5.00	4.40	5.00	4.60	16.13
Cincinnati	6.20	5.60	6.20	5.80	16.13

Pig Iron

Per Gross Ton

From	To New York	To Baltimore	To Boston	To Philadelphia	To Pacific Coast
Pittsburgh	$4.10	$3.50	$4.10	$3.70	$14.78
Wheeling	4.10	3.50	4.10	3.70	14.78
Youngstown	4.50	3.90	4.50	4.10	14.78
Chicago	6.80	6.20	6.80	6.40	12.99
Cleveland	4.80	4.20	4.80	4.40	14.78
Cincinnati	5.90	5.30	5.90	5.50	14.78

Rails

Per Gross Ton

From	To New York	To Baltimore	To Boston	To Philadelphia	To Pacific Coast
Pittsburgh	$4.00	$3.70	$4.00	$3.80	$15.46
Youngstown	4.20	3.90	4.20	4.00	...
Chicago	6.75	6.15	6.75	6.35	11.20

AIRCO
DAVIS APPARATUS
BURNS - BOURNONVILLE CO.

ANYTHING AND EVERYTHING
FOR OXYACETYLENE WELDING AND CUTTING

SERVICE

ECONOMY

Public faith in a product is a reflection of faithful performance. Thus, consistently, have Airco Oxygen and Airco Acetylene built up good-will.

Write for Airco booklet:
"Anything and Everything for Oxyacetylene Welding and Cutting"

AIR REDUCTION SALES COMPANY

Manufacturer of Airco Oxygen — Airco Acetylene — Airco-Davis-Bournonville Welding and Cutting Apparatus and Supplies, Acetylene Generators, and Specially Designed Machines for Automatic Welding and Cutting— Nitrogen, Argon and other Airco Atmospheric Gas Products

Controls the manufacture and sale of National Carbide

Home Office: 342 Madison Avenue, New York, N.Y.

Airco District Offices, Plants and Distributing Stations conveniently located throughout the Country.

Air Reduction Sales Company maintains its own Apparatus Repair Shops in Airco District Office cities.

"Airco Oxygen and Acetylene Service is Good Service."

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	15.00 to 16.00
Boston (dealers)	14.00 to 14.50
Buffalo	20.00 to 20.50
Chicago	17.50 to 18.00
Cleveland	18.00 to 18.50
Cincinnati	16.50 to 17.00
Detroit (dealers)	17.50 to 18.00
Eastern Pennsylvania	18.00 to 18.50
New York (dealers)	14.50 to 15.00
Pittsburgh	20.50 to 21.00
St. Louis	17.00 to 17.50
Valleys (nominal)	20.75 to 21.00
No. 1 railroad steel New York (dealers)	15.00 to 15.50

BUNDLED SHEETS

Buffalo	$16.25 to 16.75
Cleveland	12.75 to 13.00
Cincinnati	13.00 to 13.50
Detroit	15.50 to 16.00
Eastern Pennsylvania	16.00 to 16.50
Pittsburgh	18.00 to 18.50
St. Louis	12.00 to 12.50
Valleys	15.00 to 15.50

STEEL RAILS, SHORT

Birmingham	17.50 to 18.00
Boston (dealers)	14.50 to 15.00
Chicago	20.00 to 20.50
Cincinnati	23.00 to 23.50
Cleveland	17.00 to 17.25
St. Louis	19.00 to 19.50

STOVE PLATE

Birmingham	15.00 to 16.00
Boston	17.50 to 18.00
Buffalo	20.00 to 21.00
Chicago	17.00 to 17.50
Cincinnati (net tons)	12.00 to 12.50
Cleveland	16.00 to 16.25
Detroit (net ton) (dealers)	15.00 to 16.00
Eastern Pennsylvania	17.00 to 18.00
New York (dealers)	13.50 to 14.00
Pittsburgh	16.00 to 16.50
St. Louis	15.50 to 16.00

LOW PHOSPHORUS

Buffalo	26.00 to 27.00
Cincinnati	17.00 to 18.00
Eastern Pennsylvania	25.00 to 26.00
Pitts. billets and bloom crops	25.00 to 25.50

SHOVELING STEEL

Chicago	17.25 to 17.75
Pittsburgh	18.00 to 18.50
St. Louis	16.50 to 17.00

KNUCKLES, COUPLERS & SPRINGS

Chicago	22.00 to 22.50
Eastern Pennsylvania	24.00 to 25.00
Pittsburgh	23.00 to 23.50
St. Louis	23.00 to 23.50

COMPRESSED SHEETS

Buffalo	19.50 to 20.50
Chicago	16.00 to 16.50
Pittsburgh	19.50 to 20.00
Cleveland	16.00 to 16.50
Detroit (dealers)	17.00 to 17.50
Valleys	19.00 to 19.50

FROGS, SWITCHES, GUARDS

Chicago	17.50 to 18.00
Eastern Pennsylvania	18.00 to 18.50
St. Louis	17.00 to 17.50

BOILER PLATE, CUT

St. Louis	12.00 to 12.50

ANGLE BARS—STEEL

Chicago	18.50 to 19.00
St. Louis	18.00 to 18.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	15.00 to 16.00
Boston (dealers)	17.00 to 18.00
Buffalo	20.00 to 21.00
Chicago, No. 1	16.75 to 17.25
Chicago, No. 2	17.50 to 18.00
Cincinnati No. 1	14.50 to 15.00
Eastern Pennsylvania, No. 1	22.00 to 23.00
Pittsburgh, No. 1	20.00 to 20.50
Pittsburgh No. 2	20.50 to 21.00
New York, No. 1 (dealers)	19.00 to 20.00
St. Louis, No. 1	17.00 to 17.50
St. Louis, No. 2	16.50 to 17.00

WROUGHT PIPE

Boston (dealers)	10.50 to 11.00
Buffalo	17.00 to 18.00
Eastern Pennsylvania	15.00 to 16.00
New York (dealers)	11.50 to 12.00

YARD WROUGHT

Boston	14.00 to 14.50
Eastern Pennsylvania	19.00 to 20.00

CITY WROUGHT

New York, long	$16.50 to 17.00

BUSHELING

Buffalo, No. 1	19.00 to 20.00
Chicago, No. 1	16.25 to 16.75
Chicago, No. 2	12.50 to 13.00
Cincinnati No. 1	13.00 to 13.50
Cleveland, No. 1	15.75 to 16.00
Cleveland, No. 2	11.50 to 12.00
Detroit, No. 1	14.00 to 15.00
Detroit, No. 2 (new)	13.00 to 13.50
Detroit, No. 2 (old)	13.00 to 14.00
Eastern Pennsylvania	20.00 to 21.00
Pittsburgh, No. 1	16.50 to 17.00
St. Louis No. 1	16.00 to 16.50

MACHINE SHOP TURNINGS

Birmingham	8.00 to 10.00
Boston (dealers)	11.00 to 11.50
Buffalo	17.50 to 18.00
Chicag	11.50 to 12.00
Cleveland	15.75 to 16.00
Cincinnati (net tons)	11.50 to 12.00
Detroit (dealers)	12.00 to 12.50
Eastern Pennsylvania	16.50 to 17.00
New York (dealers)	14.00 to 14.50
Pittsburgh	16.00 to 16.50
St. Louis	12.00 to 12.50
Valleys	16.50 to 17.00

CAST IRON BORINGS

Birmingham (chemical	16.00 to 17.00
Birmingham (plain)	10.00 to 11.00
Boston (chemical)	14.50 to 15.00
Boston (dealers)	13.50 to 14.00
Buffalo	19.00 to 20.00
Chicago	14.00 to 14.50
Cincinnati (net tons)	11.00 to 11.50
Cleveland	16.25 to 16.50
Detroit (dealers)	13.00 to 13.50
Eastern Pennsylvania	16.50 to 17.00
Eastern Pennsylvania (chem.)	20.00 to 21.00
Pittsburgh	17.50 to 18.00
New York (dealers' price)	14.00 to 14.50
St. Louis	13.50 to 14.00
Valleys	17.50 to 17.75

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Boston (dealers)	11.00 to 11.50
Cleveland	16.00 to 16.25
Detroit (dealers)	12.50 to 13.00
Eastern Pennsylvania	16.00
New York (dealers)	13.25 to 13.75

IRON AXLES

Birmingham	25.00 to 26.00
Boston (consumers)	31.00 to 32.00
Buffalo	30.00 to 31.00
Chicago	29.00 to 29.50
Cincinnati	25.00 to 26.00
Eastern Pennsylvania	nominal
New York (dealers)	29.00 to 30.00
St. Louis	27.00 to 27.50

IRON RAILS

Buffalo	$23.00 to 23.50
Chicago	22.00 to 22.50
Cincinnati	15.00 to 15.50
St. Louis	18.50 to 19.00

PIPES AND FLUES

Chicago	12.50 to 13.00
Cincinnati	12.00 to 12.50
Cleveland	12.50 to 13.00
St. Louis	12.75 to 13.25

RAILROAD GRATE BARS

Buffalo	18.00 to 19.00
Chicago	16.25 to 16.75
Cleveland	16.00 to 16.25
Eastern Pennsylvania	17.50 to 18.00
New York (dealers)	13.50 to 14.00
St. Louis	16.50 to 17.00

FORGE FLASHINGS

Boston (dealers)	13.00 to 13.50
Chicago, small	12.50 to 13.00
Cleveland, small	15.25 to 15.50
Cleveland, large	15.00 to 15.25
Detroit (dealers)	13.00 to 13.50

FORGE SCRAP

Boston (dealers)	12.75 to 13.00
Chicago	17.50 to 18.00
Eastern Pennsylvania	17.00 to 18.00

ARCH BARS AND TRANSOMS

Chicago	25.00 to 25.50
St. Louis	25.00 to 25.50

ANGLE BARS—IRON

Chicago	25.00 to 25.50
St. Louis	25.00 to 25.50

Iron and Steel Works Scrap

AXLE TURNINGS

Boston (dealers)	14.50 to 15.00
Buffalo	22.50 to 23.00
Chicago	15.50 to 16.00
Cleveland	17.00 to 17.50
Eastern Pennsylvania	19.00 to 20.00
Pittsburgh	17.50 to 18.00
St. Louis	13.50 to 14.00

STEEL CAR AXLES

Birmingham	22.00 to 23.00
Boston (consumers)	24.00 to 25.00
Buffalo	24.50 to 25.50
Chicago	22.50 to 23.00
Cleveland	24.00 to 25.00
Eastern Pennsylvania	nominal
New York (dealers)	nominal
Pittsburgh	24.00 to 24.50
St. Louis	22.00 to 22.50

SHAFTING

Boston (consumers)	23.00 to 23.50
Chicago	24.00 to 24.50
Eastern Pennsylvania	24.00 to 25.00
New York (dealers)	21.50 to 22.00
St. Louis	23.00 to 23.50

Iron Foundry Scrap

CAR WHEELS

Birmingham, tram car	20.00 to 21.00
Birmingham, iron	19.00 to 20.00
Boston (consumers)	22.00 to 23.00
Buffalo, iron	21.00 to 22.00
Chicago, iron	21.00 to 21.50
Cincinnati	17.00 to 17.50
Eastern Pennsylvania	22.00 to 24.00
New York iron (dealers)	18.00 to 19.00
Pittsburgh, iron	22.00 to 22.50
Pittsburgh, steel	23.00 to 23.50
St. Louis, iron	21.00 to 21.50

NO. 1 CAST SCRAP

Birmingham, cupola	20.00 to 21.00
Boston (consumers)	23.50 to 24.00
Buffalo	23.00 to 24.00
Chicago, cupolt	23.75 to 24.25
Cincinnati No. 1, machinery cupola (net tons)	22.00 to 22.50
Cleveland, cupola	22.00 to 23.00
Detroit (net ton) (dealers)	18.00 to 19.00
Eastern Pennsylvania, cupola	22.00 to 23.00
New York, cupola (dealers)	19.00 to 20.00
Pittsburgh, cupola	23.50 to 24.00
San Francisco	26.00 to 28.00
St. Louis, railroad	20.50 to 21.00
St. Louis, agricultural	20.50 to 21.00
Valleys	22.50 to 23.00

HEAVY CAST

Boston (consumers)	20.00 to 21.00
Buffalo	18.00 to 19.00
Cleveland	15.00 to 15.50
Detroit (automobile) (net ton)	23.00 to 23.50
Eastern Pennsylvania	19.00 to 19.50
New York (dealers)	18.00 to 19.00
Pittsburgh	18.00 to 18.50

MALLEABLE

Boston (railroad) (consumers)	24.00 to 25.00
Buffalo	24.00 to 25.00
Chicago, railroad	23.50 to 24.00
Chicago, agricultural	23.50 to 24.00
Cincinnati, agricultural	17.50 to 18.50
Cincinnati, railroad	19.50 to 20.00
Cleveland, agricultural	22.00 to 22.50
Cleveland, railroad, nominal	25.00 to 25.50
Detroit (dealers)	22.00 to 23.00
Eastern Pennsylvania, railroad	22.00 to 23.00
Pittsburgh, railroad	24.00 to 24.50
St. Louis, agricultural	19.50 to 20.00
St. Louis, railroad	20.00 to 21.00

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	19.00 to 20.00
Boston (dealers)	16.50 to 17.00
Chicago	19.00 to 19.50
Cleveland	20.50 to 21.00
Detroit	16.00 to 16.50
Eastern Pennsylvania	20.00 to 21.00
New York (dealers)	20.00 to 20.50
Pittsburgh district	21.50 to 22.00
St. Louis	18.50 to 19.00

LOCOMOTIVE TIRES

Chicago	18.50 to 19.00
St. Louis	18.00 to 18.50

LOW PHOSPHORUS PUNCHINGS

Chicago	19.50 to 20.00
Eastern Pennsylvania	26.00 to 28.00
Pittsburgh	24.50 to 25.00